LEADING CLAY JOURNAL OF THE WORLD / A CAHNERS PUBLICATION / AUGUST, 1961 / 75c

Brick & Clay RECORD

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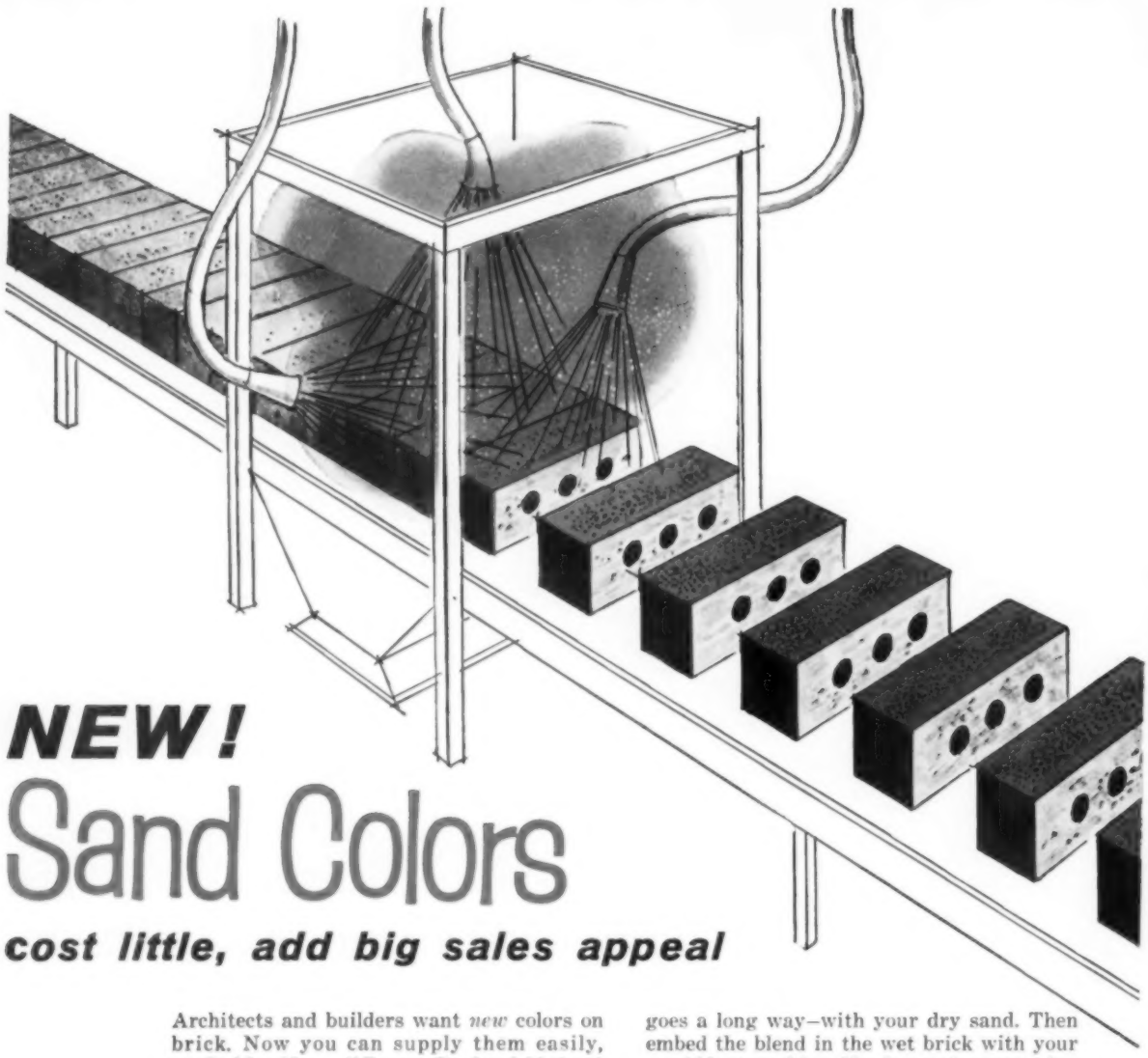
Beauty in Structural Clay from Carolina Ceramics—See Page 5

Is 'Clay Bonded Block' a Misnomer?

Insulating Firebrick for the Shuttle Kiln

Solve Your Problems in Heating and Cooling

Research in High Gear at SCPRF



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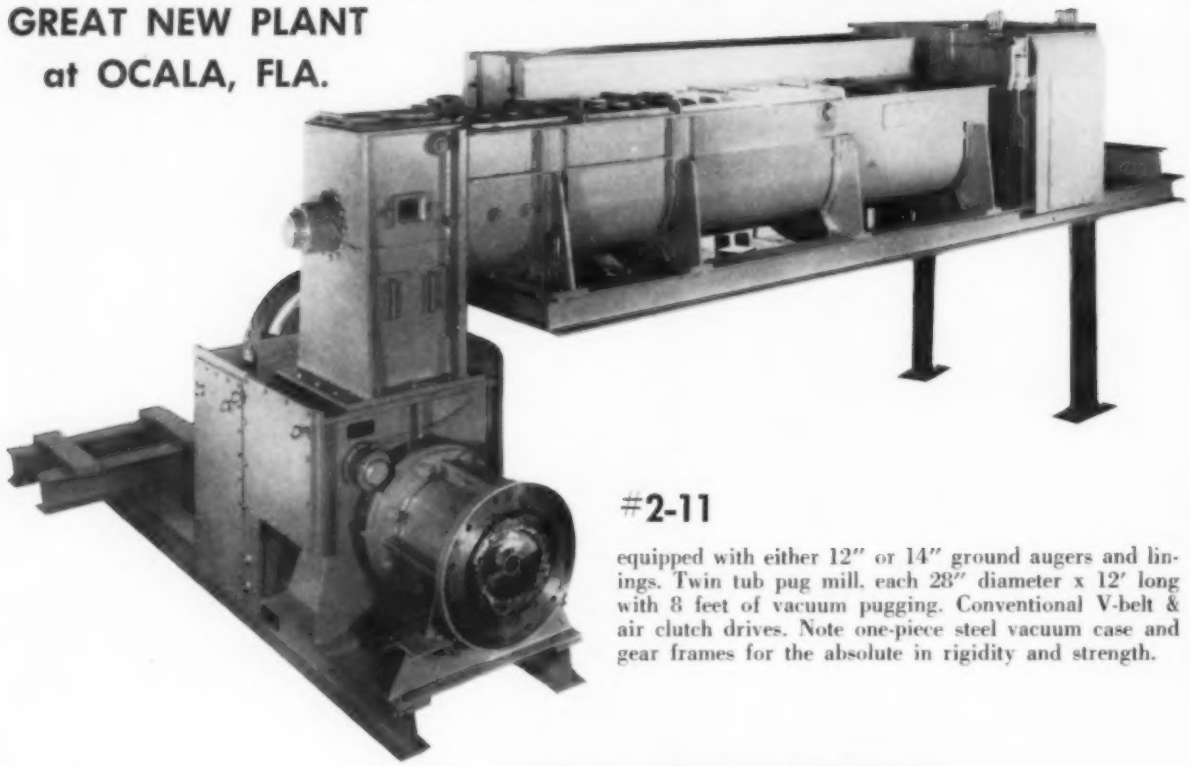

#2-11

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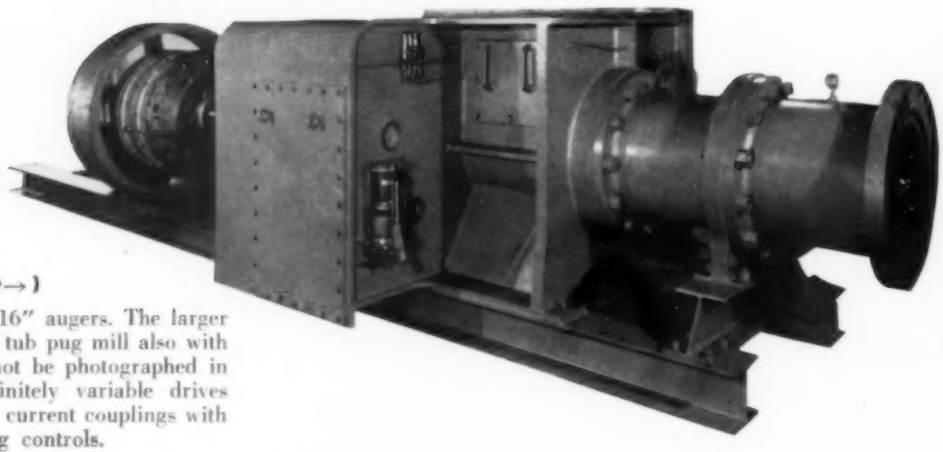

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THIS MONTH'S COVER

It is fitting that this month's cover of Brick & Clay Record should picture a peaceful scene highlighting structural clay products at their most beautiful. The materials shown are the products of Carolina Ceramics, Inc., Columbia, S.C. The late L. R. Whitaker was president of Carolina Ceramics and in this issue you will find Mr. Whitaker's last paper, concerning problems of heating and cooling in structural clay products production. The paper begins on page 35.

A CAHNERS PUBLICATION

Brick & Clay RECORD

Contents for August, 1961 • Vol. 139, No. 2

35 Solve Your Problems in Heating and Cooling

The late L. R. Whitaker's last paper concerns problems which may crop up in the tunnel kiln with regard to heating and cooling. Mr. Whitaker offers solutions to common problems based on his own long experience in the production of structural clay products.

38 Is It 'Clay Bonded Block' or 'Ceramic Block'?

Our author, Roy B. Moffitt, of North Carolina State College, contends that "clay bonded block" is a misnomer, since clay is not even required to produce a block which will satisfy the demands of economic competition and meet ASTM specifications for block. He suggests the name "ceramic block" be substituted and sets forth the reasons for his position.

41 TRI Elects, Adds New Members

The Refractories Institute met recently at the Greenbrier and elected Robert W. Knauft, of Chas. Taylor Sons Co., president. At the same meeting, the TRI welcomed four new member companies and heard reports on technical and research matters.

42 Research Shifts Into High Gear at SCPRF

The personnel at the Structural Clay Products Research Foundation were bursting with enthusiasm during the recent midyear meeting. The Foundation reported a breakthrough in the lightweight program and listed seven major projects for the coming year, concentrating on new product and plant research.

46 Brick Plant Uses Shuttle Kiln Profitably

The Rio Brick Co., El Paso, Texas, produces white brick for a 3-state area and does it most successfully. Established to fill a void caused by the demise of a former brick producer, Rio Brick now fills brick needs within an 800-mile radius.

48 How Insulating Firebrick Affect Shuttle Kiln Performance

Shuttle kilns have established a definite place for themselves in all branches of the ceramic industry. Since they operate on a periodic basis the selection of the refractory lining is of utmost importance with regard to operation. Here is definitive information on making the right choice of insulating firebrick.

Departments

18	New Products	31	SCPRF News
20	Literature	32	Refractory News
25	Editorial	51	Circle Service Card
26	News of the Industry	66	Classified Ads

Leading Clay Journal of The World
Established 1892; Now in 69th Year

The magazine of brick, drain tile, structural tile, clay aggregate, terra cotta, roofing tile, refractories, clay pipe, and abrasives.

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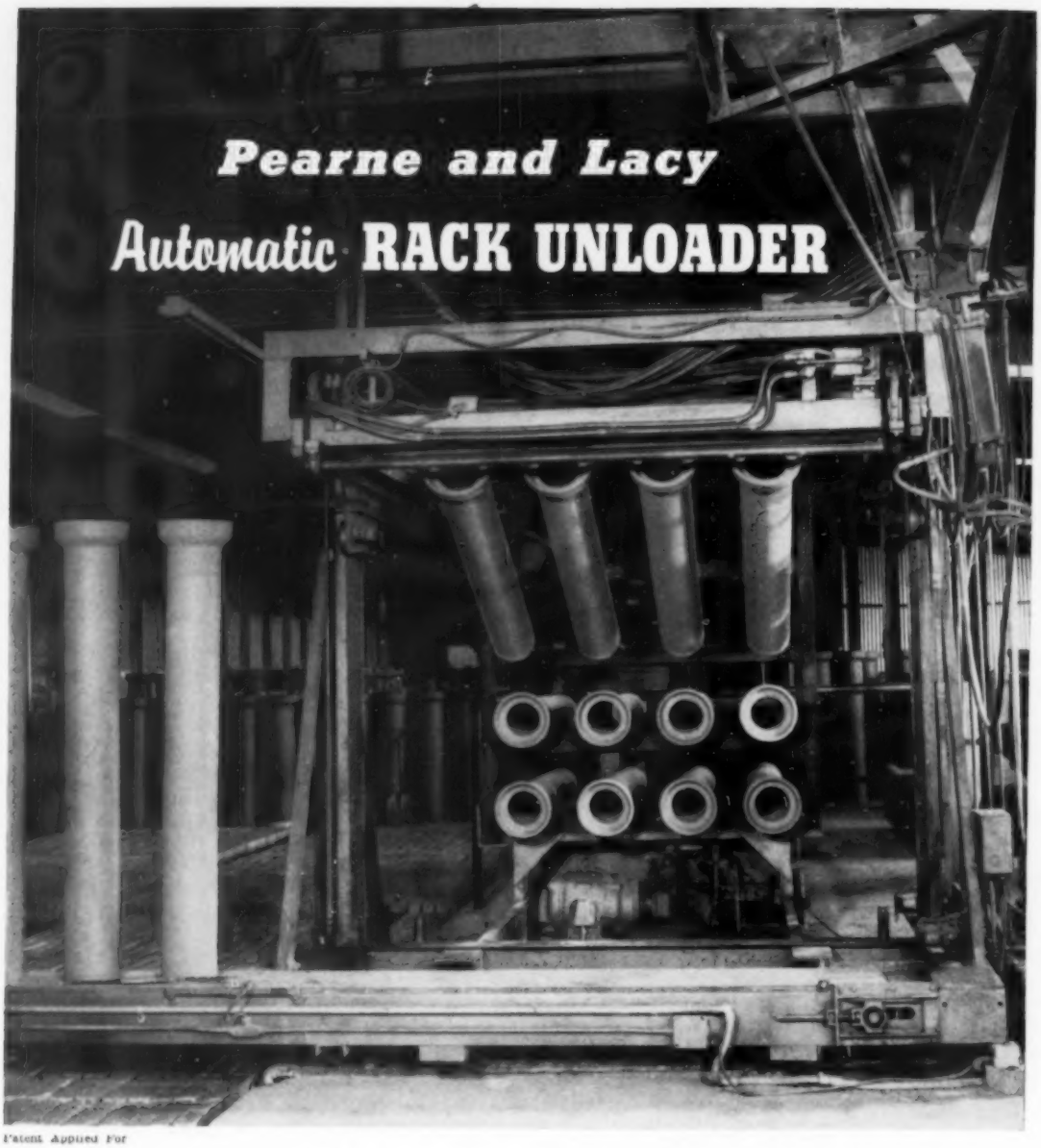

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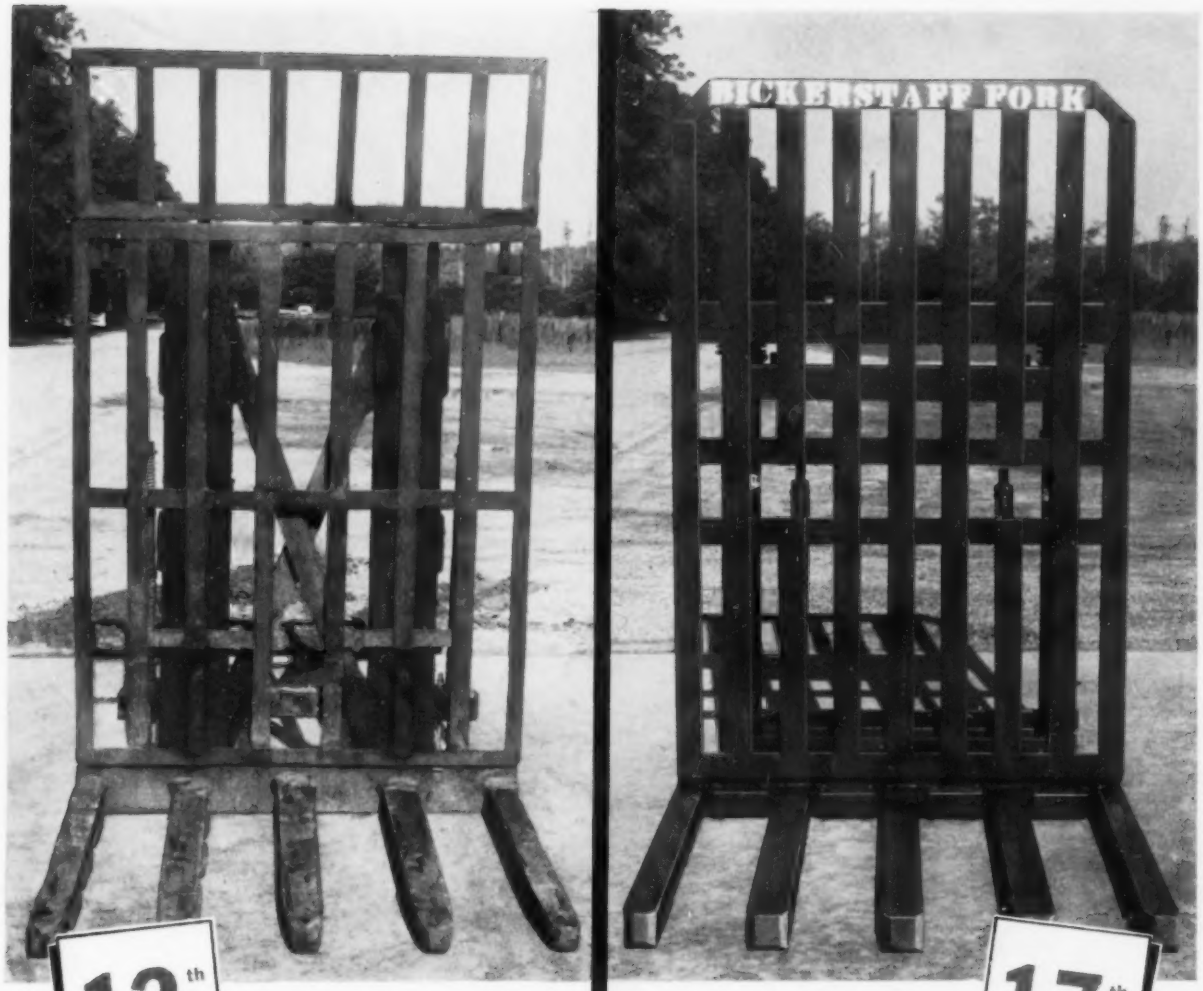

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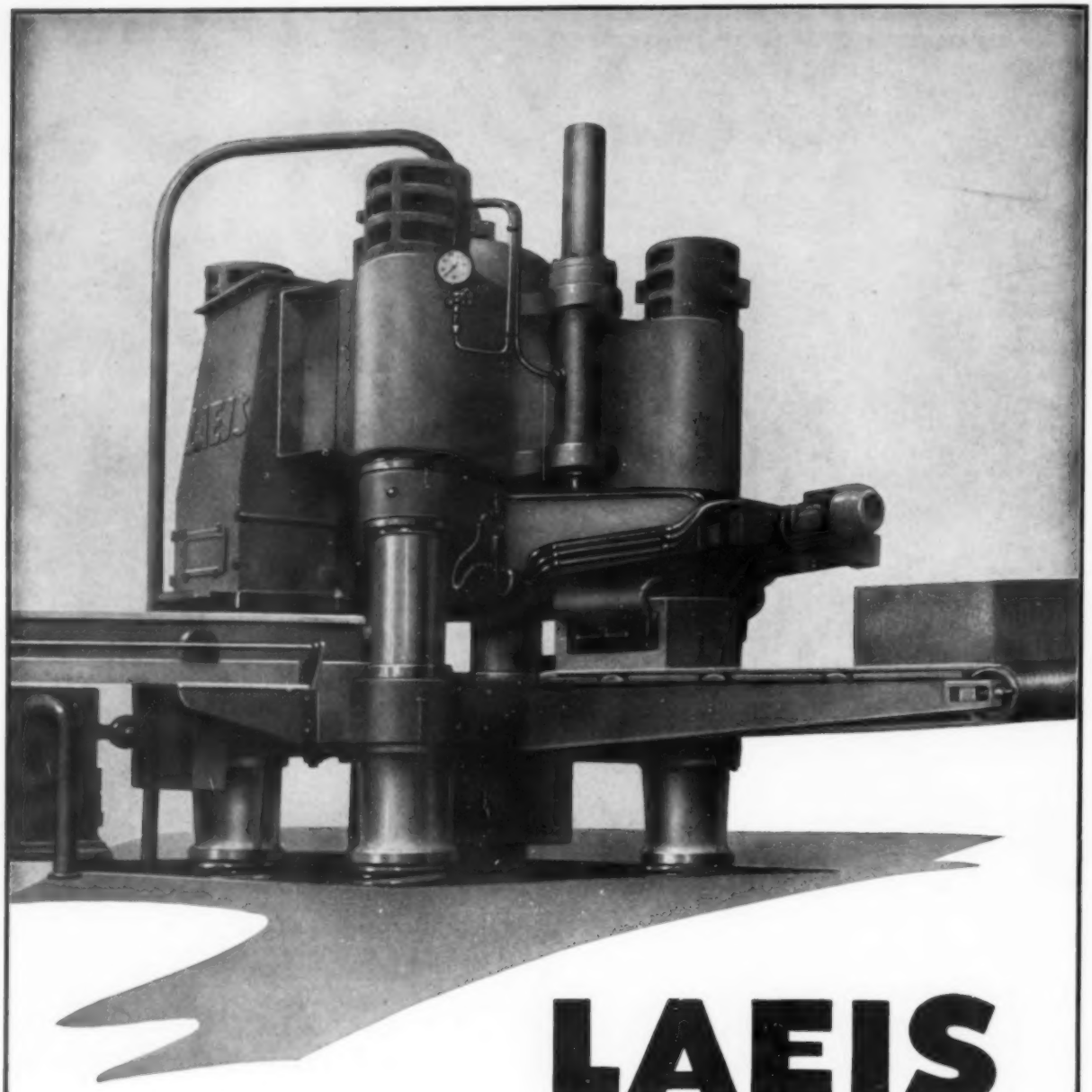

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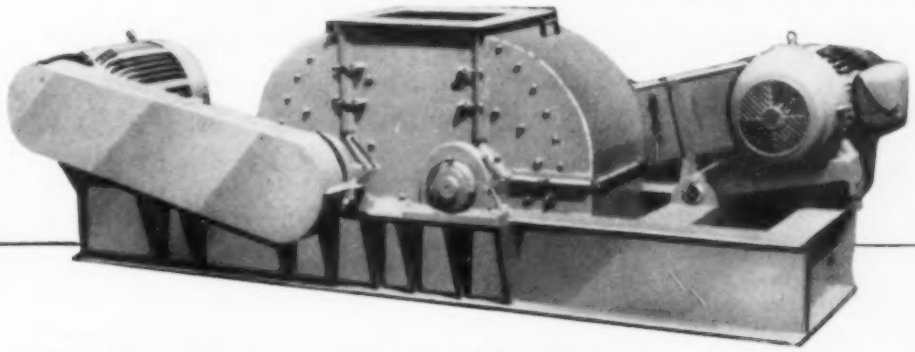

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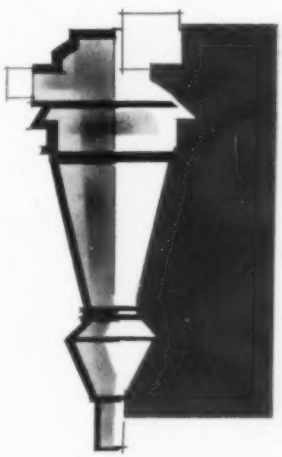

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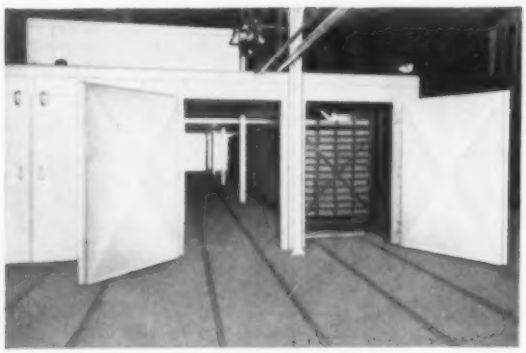

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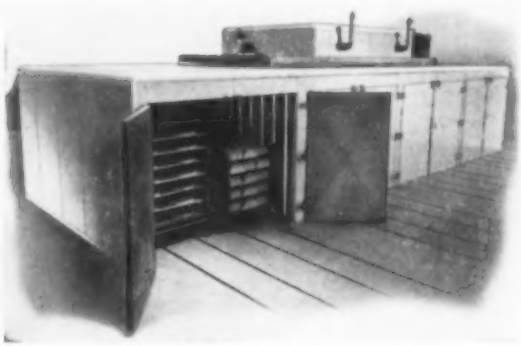

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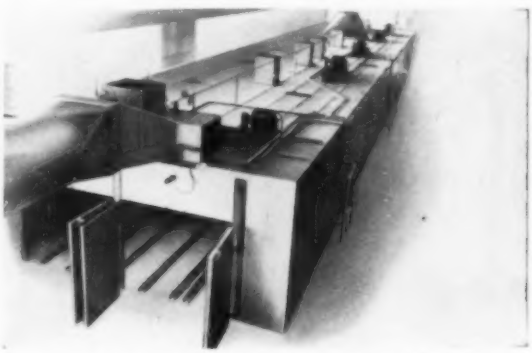

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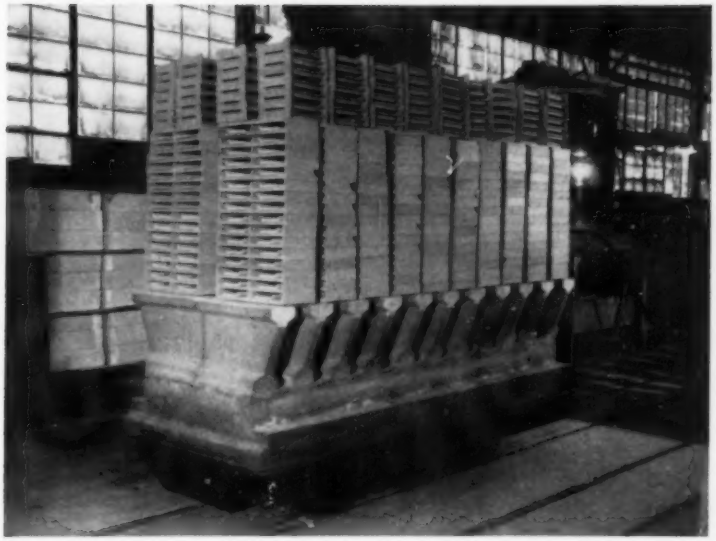

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R-674

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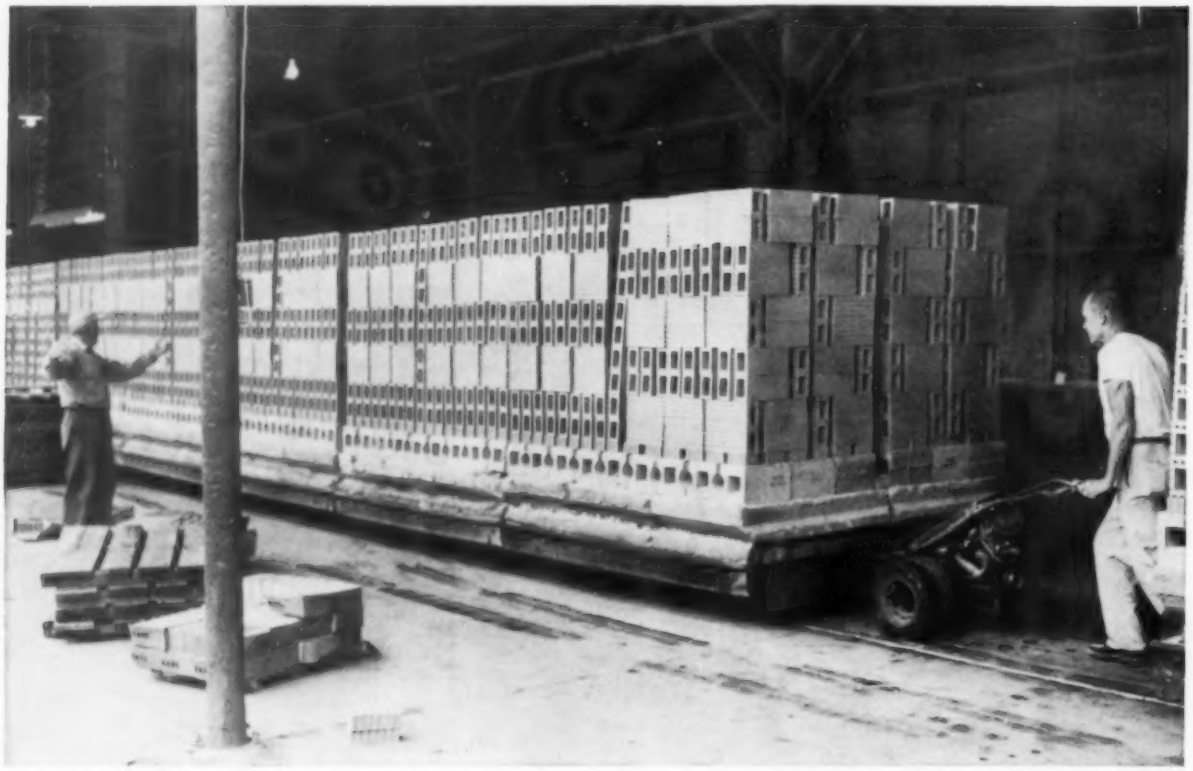

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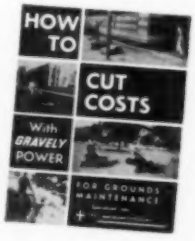

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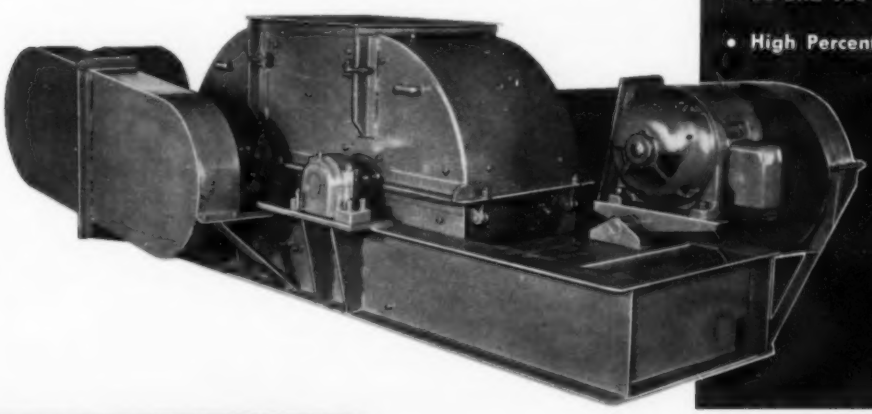
- High Percentage of Fines



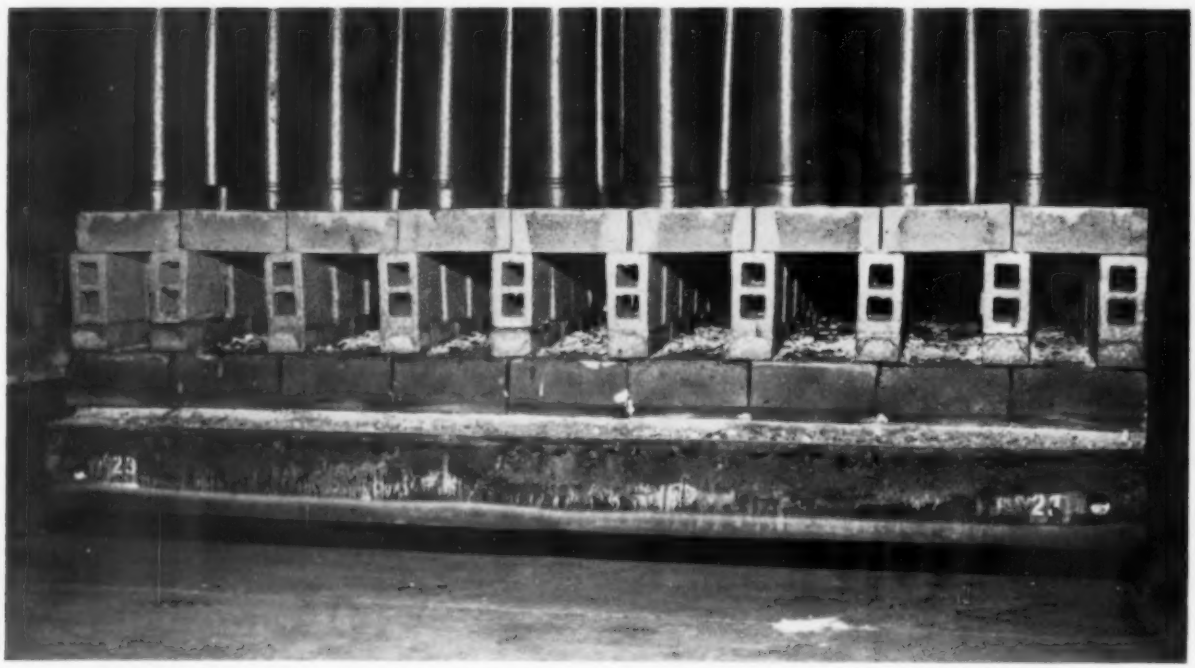
Miller Equipment Company

P. O. Box 1566 • Phone ME 3-3541 • Salisbury, N. C.

Pacific Agent:
WALTER C. STOLL & SONS
5028 Alhambra Avenue
Los Angeles 32, California

Circle Service No. 13

Logan converts 100% to PACO Girders!



Unretouched photo showing PACO cored tile girders after three years of continuous service. Photo courtesy of Logan Clay Products Company, Logan, Ohio.

Replacement cut 50% in 3-year continuous salt-glazing operation

Imagine . . . a 50% slash in car top replacement, lower initial cost and a reduction in inventory problems through a less complicated car top arrangement! That's what PACO has done in dozens of plants, and what it can do in your operation. Here's why.

Only PACO Car Tops are made from the mineral pyrophyllite. This makes them more durable because of a higher resistance to thermal shock and hot load deformation. Greater strength permits construction of the thin wall (1⅜" max.), large core PACO girder block shown above. The large open core allows products of combustion to freely pass through, around and between each girder and on to the entire deck surface. It eliminates "bottling up" of heat in any one area. Cooling is also more uniform and will not reheat ware in cooling zone of kiln. And, in the case of the Logan installation, PACO Car Tops had prolonged resistance to salt glazing.

PACO Car Tops are made in a wide variety of shapes and sizes. Phone or write for complete information today.

NORTH STATE PYROPHYLLITE COMPANY, INC.

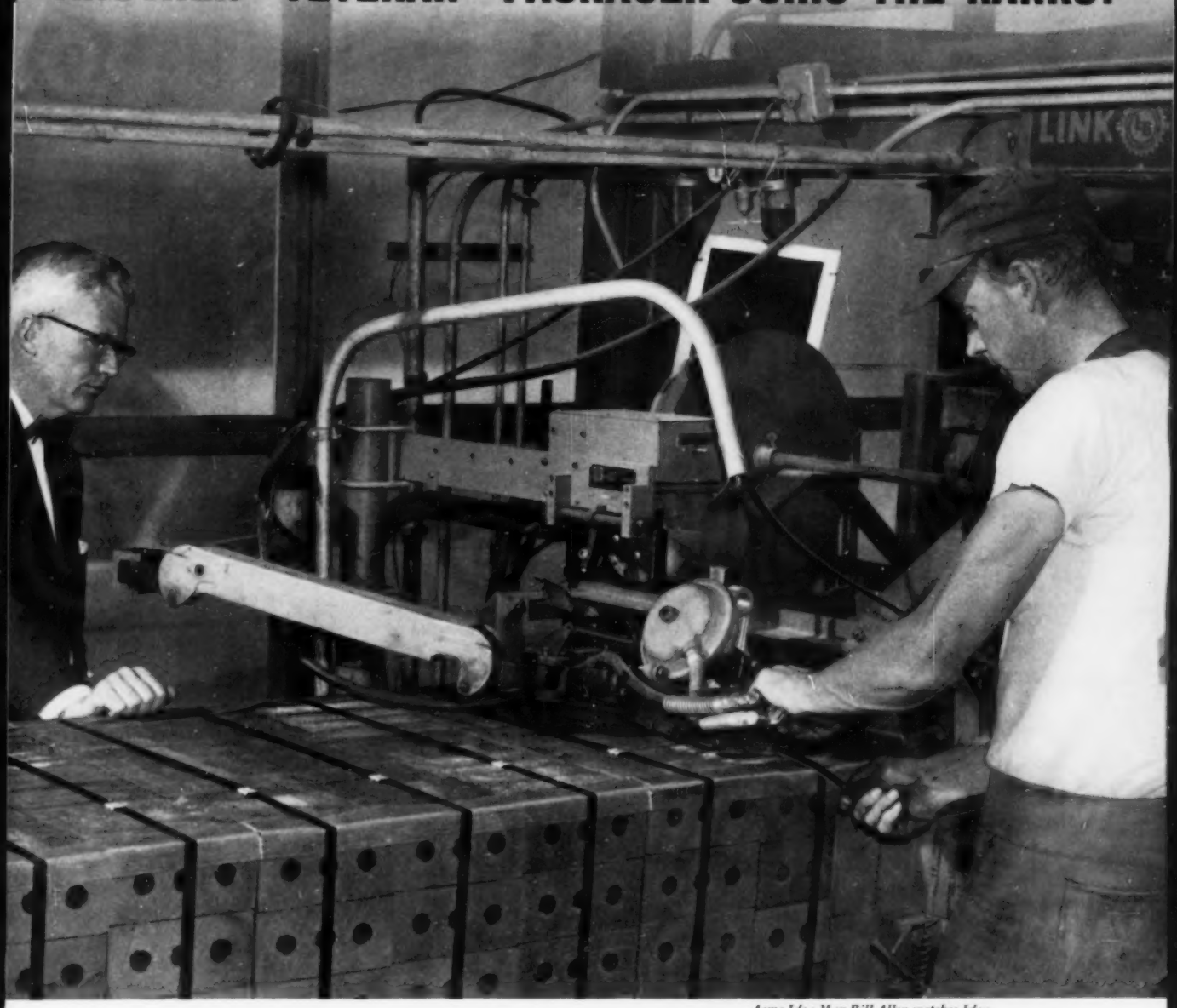
Phone CYpress 9-1441 • Greensboro, North Carolina

OTHER PACO PRODUCTS INCLUDE: • Plastic Furnace Linings • High Temperature Cement • Fire Brick • Retort Cement • Blow Off Tile • Side Car Brick • Ladle Mix • Rear Arch Tile • Plastic Cupola Linings • Cupola Blocks

Circle Service No. 14

Circle Service No. 15 ⟶

ANOTHER "VETERAN" PACKAGER JOINS THE RANKS!



Acme Idea Man Bill Allen watches Idea No. S3-72 cut costs at Robinson Brick & Tile Company, Denver, Colo.

This Link-Belt/Acme Steel brick packaging machine has been cutting costs, keeping packaging production abreast of demand at Robinson Brick & Tile Company for nearly two years. It's a proven veteran, joining the ranks of other seasoned Link-Belt/Acme Steel installations—some which have been operating day-in, day-out for nearly three years!

Ejecting a perfectly strapped, 100-brick pack every 22 seconds, the machine can handle up to 130,000 brick daily—all 65 kinds of "ROBCO" standard, Norman and Roman sizes. As a result, Robinson eliminates Saturday work... plans production so weekly output is packaged in 5 days!

Clip the coupon for full facts. We have also prepared a color film of the Link-Belt/Acme Steel brick packaging machine. For viewing arrangements, write us on your letterhead.

ACME STEEL IDEA LEADER IN **STRAPPING**

ACME STEEL COMPANY
A·me Steel Products Division
Dept. BCS-81
135th St. & Perry Ave.
Chicago 27, Ill.

Please send me Idea No. S3-72 and examples of how other major brick producers are using Acme Steel Strapping.

*Name*_____

*Title*_____

*Firm*_____

*Address*_____

*City*_____ *Zone*____ *State*____

MATERIALS & EQUIPMENT IN THE NEWS

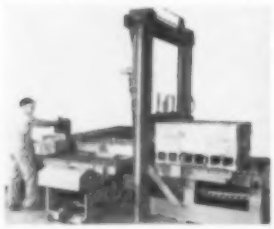
Periodic Kiln

Operation of the kiln is fully automatic, and the preset cycle can be changed or altered at any time, either in the firing or in the cooling—after the cycle has started.

The unit has a working chamber 21" wide, 60" long and 36" high, and its efficiency allows a gross load of 1600 lbs. to be cooled from 2500°F to approximately 200°F in eight hours. *Lindberg Engineering Co.*

Circle Service No. 58

Semi-Automatic Cuber



Cubes may be formed with or without pallets. The machine automatically compensates for the height of the pallet and each preceeding layer by the ingenious use of an electron eye. *Columbia Machine.*

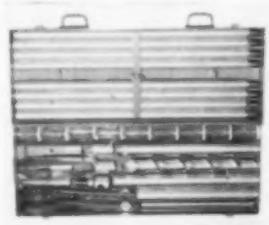
Circle Service No. 59

Belt Splice

Features an economically spliced moistureproof belt in 1½ hours. These plates are speedily attached after a simple countersinking operation and covered with a rubber strip. The result is a joint that prevents fabric rot due to moisture, a cleaner scraper operation, and the elimination of wear on idler rollers. *The Crescent Fastener Co., Inc.*

Circle Service No. 60

Soil Hand Kit



This company announces the immediate availability of a soil exploration hand kit that has proven efficient and useful in recovering samples of practically any materials except rocks. The kit is designed for hand operation, with a metal carrying case, containing a collection of ten different earth and soil sampling tools along with tools to sample depths of 20 feet. *Testlab Corp.*

Circle Service No. 61

Butterfly Valve

A new line of low-cost butterfly air valves with integral electric motors has high and low positions quickly and easily set by movement of limit switches. The unit can be installed in any position, and is available in 1" through 6" pipe sizes. These valves are commonly used for low pressure process and combustion air applications at pressures up to 5 psi. *The North American Mfg. Co.*

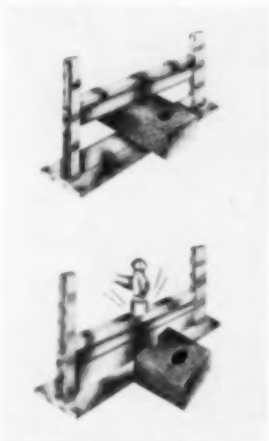
Circle Service No. 62

Loader

Recently introduced is a new 8,000 lb. capacity Cary-Lift Loader for operation over rough terrain and unpaved yard areas. An unusual feature of this new loader is its ability to hydraulically extend the forks 10'6" forward. This enables it to reach out and load rail cars or trucks entirely from one side, or to reach over obstacles to pick up or place a load. *Pettibone Mulliken Corp.*

Circle Service No. 63

Masonry Cutter



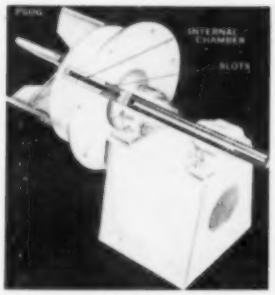
A new lightweight, portable brick, stone and tile cutter for the masonry trade offers accurate and fast cutting at minimum cost. The unit ruggedly constructed, with blades of impact-resistant steel and hardened to guarantee a permanent cutting edge. With very little practice, one blow from a two to three pound hammer will deliver a clean fracture, and at whatever angle the brick is placed in the jaws. *Grant Manufacturing.*

Circle Service No. 64

High Temp. Fans

A new and important feature of this company's new line of high temperature fans, is an unique air-cooled shaft, which eliminates the need for water cooling, and other complex cooling devices.

Made of nickel chromium



stainless steel, this shaft is designed to function effectively under conditions of high speed, pressure and temperature. *Garden City Fan & Blower Co.*

Circle Service No. 65

Fluriatic Acid

A new product which has been developed to etch concrete on construction jobs is available as a dry yellowish powder in any quantity and in easily handled fiber drums from 20 lbs to 400 lbs. *Brick Research Associates.*

Circle Service No. 66

Potentiometers

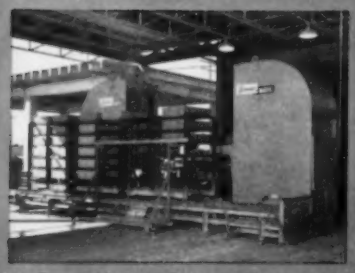
Three new, low-cost, portable potentiometers provide on-the-spot measurements of temperature for instrument maintenance departments, and in testing and research work.

All three instruments have a basic accuracy of ± 0.3% of range and have a pointer galvanometer with sensitivity of 0.6 μa per scale division. Designed to withstand rugged operation, they are compact in size—only 7" x 6" x 5"—and weight only 4½ lbs. *Leeds & Northrup Co.*

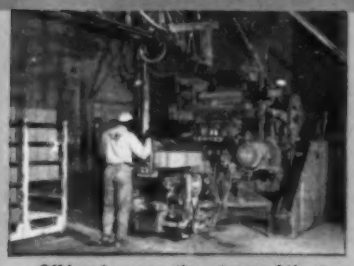
Circle Service No. 67

Circle Service No. 16 ⟶

Foreman checking block height as block comes from Vibrapac in Meekins' Pompano Beach plant. Note the Besser-Matic control panel.



Besser-Matic in Pompano Beach plant does all these operations automatically: Loads green block. Indexes new rack. Unloads cured block. Depallets cured block. Returns empty pallets. No off-bearing required; no power hoist, either.



Off-bearing operation at one of the two Vibrapacs in Meekins' Hollywood plant.

Here, the cubing-clamp operator at the Pompano Beach plant has lifted block from a roller conveyor and is building a 75-unit cube on a cube conveyor.

Mr. Clifton Meekins, president and founder of Meekins, Inc., viewing Hollywood plant from his office window.

Reliability of Besser equipment and service

helps Florida blockmaker keep maintenance cost low

Reducing maintenance costs is one way to ease today's pinch on profits. And that's just what they are doing at Meekins, Inc., Florida block company with plants in Hollywood, Pompano Beach, and Okeechobee.

The firm installed its first Vibrapac in 1955 and now operates four Vibrapacs. In addition, the fully-automatic plant at Pompano Beach is equipped with a Besser-Matic. Annual production of 8" equivalents by Meekins' three plants is about 7,000,000 units for residential, commercial, and industrial construction.

When asked the reasons why the company prefers Besser equipment, a representative of the Meekins management summed it up with these words: "Durability, precision, long life, and an excellent Besser service staff. High quality at low maintenance cost."

Can *you* say the same about the concrete block equipment you are using? If not, it pays to look into the advantages of switching to a Vibrapac and other Besser equipment. See a Besser representative.

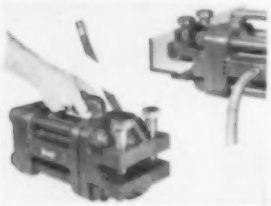
A1-245

BESSER *COMPANY*

Dept. 139, Alpena, Michigan, U. S. A. *First in Concrete Block Machines*

Meekins' Hollywood yard with an inventory of approximately 600,000 block.

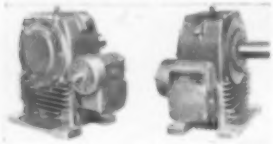
Bolt Bite Clamp



A new bolt-bite clamp has been announced that mounts the 3" LSF-VG portable air vibrator on small or narrow areas of bins, trucks, foundry core boxes, railroad cars or other objects. This new mounting method makes it possible to attach the heavy duty portable vibrator to structures which previously required a permanent vibrator installation because of limited mounting space. *Cleveland Vibrator Co.*

Circle Service No. 68

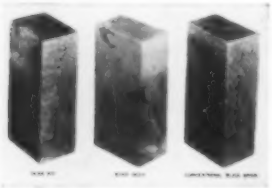
Speed Reducer



A new double reduction speed reducer is available in a wide selection of ratios ranging between approximately 25:1 and 3600:1. Units come in seven sizes with torque capacities ranging approximately between 22,700 inch pounds and 145,000 inch pounds. Reductions of up to 3600:1 have been attained by mounting a worm and gear at a 90 angle to another. *Cleveland Worm & Gear Div., Eaton Mfg. Co.*

Circle Service No. 69

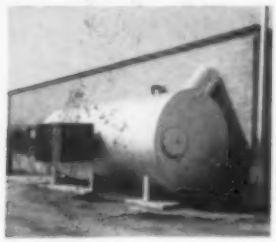
Silica Refractories



This company has developed two brands of specialized silica refractories which have a degree of spalling resistance that, according to a company spokesman, "indicates the most important advance in silica refractories in recent years." *Harbison-Walker Refractories Co.*

Circle Service No. 70

Dry Air System



This system is engineered for each installation. It draws in atmospheric air, filters it, dries it to less than 38°F dew point (day or night, in all seasons), chills it, shrinks it to high density so that the compressor delivers a greater weight of air per stroke. *Lynch Corp.*

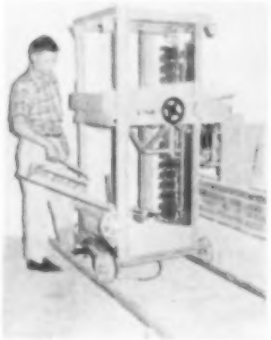
Circle Service No. 71

Ball Bearing Blocks

New in a series of heavy duty ball bearing pillow blocks, they are equipped with self-aligning, single row, deep grooved, precision ball bearings. These new heavy duty ball bearing blocks are heavier and have dimensional interchangeability with other makes. For additional information also ask for Folder 2951. *Link Belt Co.*

Circle Service No. 72

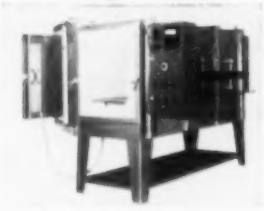
Brick Laying Machine



A machine, which is capable of laying brick at the rate of 15 per minute in either a 10" cavity wall, a four inch single thickness wall, or a brick veneer, has been successfully tested. *Demarest Machines.*

Circle Service No. 73

Electric Furnace



Model LP-2472H Dyna-Trol electric furnace has a wide range of temperatures making it applicable for heat-treating, drawing glass annealing, etc. With fans removed temperatures can be controlled to various degrees. Rigid element support and easy element replacements are some additional features. L and L Mfg. Co.

Circle Service No. 74

New Saw Blades

A new series of break-resistant abrasive blades are being marketed for use on power hand saws. Featuring exclusive "Tuff-Weve" nylon reinforcing, the new "Tuffies" utilize a patented manufacturing process that scientifically combine the reinforcing material and the abrasive grains. More cutting edges are exposed. This new process enables the blade to retain all of the break-resistant qualities. *Eveready Briksaw Co.*

Circle Service No. 75

NEW LITERATURE

Equipment—Describes complete line of dust collecting, recovery and classifying equipment. *Buell Engineering Co., Inc.*

Circle Service No. 76

Transmitter—Specification and features on the firm's line of Temperature transmitter both indicating and non-indicating. *Minneapolis-Honeywell Regulator Co.*

Circle Service No. 77

Portable Scales—Bulletin 3416 describes and illustrates a new line of portable platform scales offered by this firm. *Exact Weight Scale Co.*

Circle Service No. 78

Materials Handling—Features and specifications of the company's line of crawler and wheel utility tractor equipment. UT-142. *Allis-Chalmers Mfg. Co.*

Circle Service No. 79

Gradation Equipment—A new four page booklet devoted to all necessary equipment required to run sieve analyses, is now available. The title of this booklet is "Gradation Equipment by TESTlab." *Testlab Corp.*

Circle Service No. 80

Fork Lift Truck—Important factors to consider when buying a fork lift truck are detailed in step-by-step fashion in the most recent edition of "Handling Materials Illustrated." *Towmotor Corp.*

Circle Service No. 81

Torque Converter—"Why a Torque Converter is Standard Equipment in the Eimco Tractor Unique Power Train" is the subject of a new 24-page book. (L-1078) *The Eimco Corp.*

Circle Service No. 82

New Vibrating Screen—Complete descriptions, data and specifications, along with over 50 illustrations are presented in a new 32 page bulletin (VS-61561 recently published. *Syntron Company.*

Circle Service No. 83

Screens & Conveyors—This new 8 page booklet describes the various types of Horizontal Vibratory Screens and Conveyors, as well as information as to what they can do for you, how they work, and how they improve your operations. *Comoco Corp.*

Circle Service No. 84

Steel Strapping—Three 4-page reports (S3-69, 70, 73) describing three examples of brick manufacturers using conveyorized steel strapping systems to increase production and cut labor costs are relayed by this firm. *Acme Steel Co.*

Circle Service No. 85

Heat Processing Equipment—This recently published booklet illustrates and describes the different applications of heat processing equipment in various fields of industry. A complete pictorial rundown on types and diagrams are illustrated. *The Lanly Co.*

Circle Service No. 86

IF THE JOB CALLS FOR A SINGLE ROLL --PENNSYLVANIA'S GOT IT

Only Pennsylvania offers you this range of Single Roll Crushers —permitting precise job-engineering of the exact machine for your application.

Pennsylvania Single Rolls furnish the most economical, efficient reduction method you can get for primary and secondary crushing of a wide variety of materials—including cement rock, gypsum, limestone, mine refuse, barytes and other friable ores, shale, slag, chemicals and phosphate rock.

Combining a slow speed operation with high capacities (up to 1200 TPH), all models feature *extremely low maintenance and operating costs.*

Pennsylvania Single Rolls require very little headroom, can be choke fed, and will handle wet, sticky or frozen feeds without showing noticeable decrease in capacity.

FREE BULLETINS

Write for Pennsylvania Single Roll Bulletins, fully describing the many design features, operating advantages and application information on these famous "work horses."

PENNSYLVANIA CRUSHER DIVISION
BATH IRON WORKS CORPORATION
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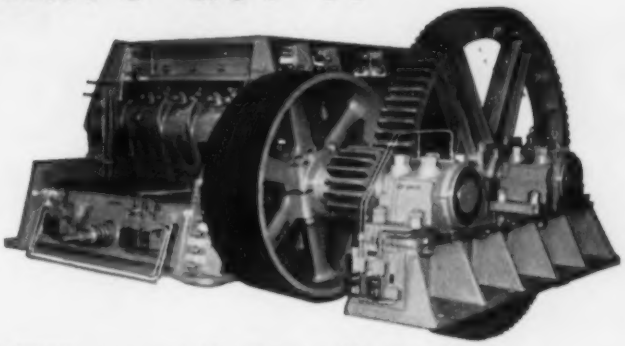
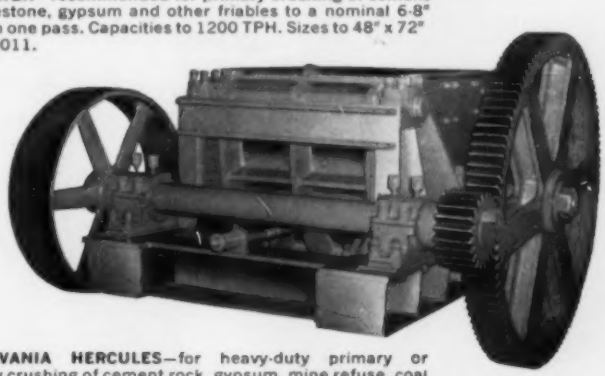
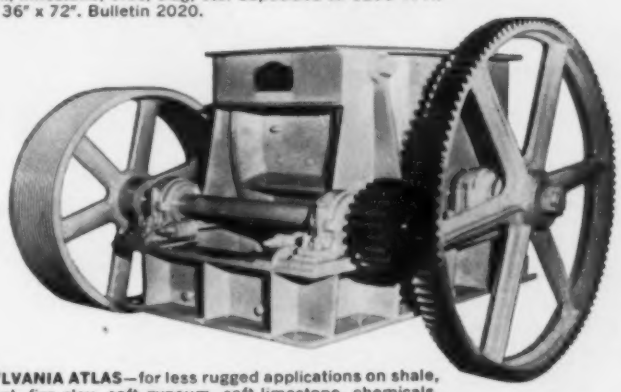


PENNLEHIGH—recommended for primary crushing of cement rock, limestone, gypsum and other friables to a nominal 6-8" product in one pass. Capacities to 1200 TPH. Sizes to 48" x 72" Bulletin 2011.



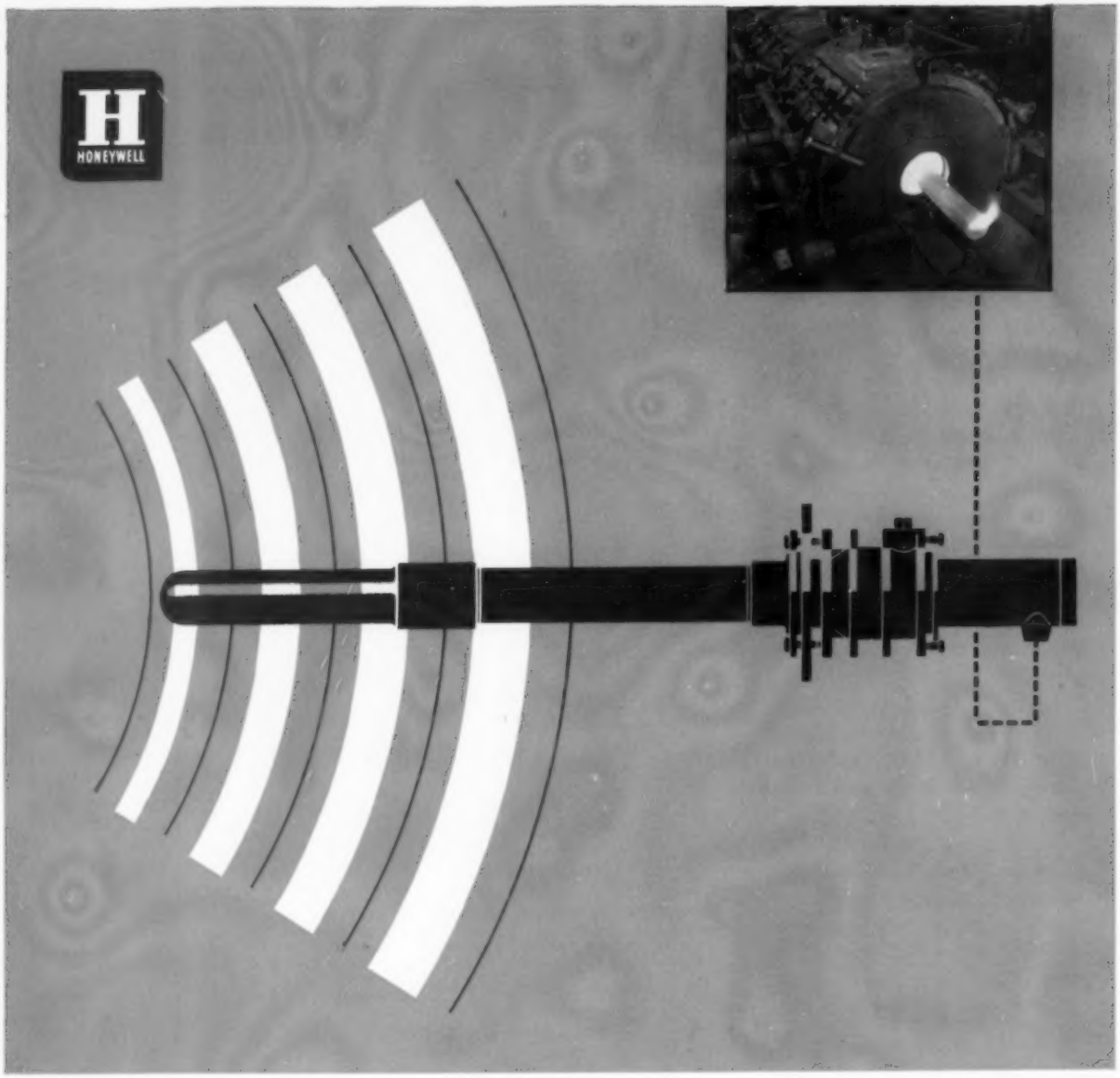
PENNSYLVANIA HERCULES—for heavy-duty primary or secondary crushing of cement rock, gypsum, mine refuse, coal with rock, limestone, ores, slag, etc. Capacities to 1200 TPH. Sizes to 36" x 72". Bulletin 2020.



PENNSYLVANIA ATLAS—for less rugged applications on shale, slate, coal, fire clay, soft gypsum, soft limestone, chemicals, etc. Capacities to 660 TPH. Sizes to 30" x 60". Bulletin 2025.

PENNSYLVANIA
BATH-BUILT
CRUSHERS

Circle Service No. 17



Specify Radiamatic Infrared Detection Systems for dependable, economical temperature measurement and control

For more than 20 years, Radiamatic Infrared Systems have been giving reliable, accurate service in every area of industrial temperature measurement and control. Over the years, Honeywell has developed special infrared techniques and equipment for a wide range of applications, including soaking pits, kilns, heat treating, induction and forging furnaces.

The key to the high accuracy and low cost of these systems is the Radiamatic Infrared Detector. Available in many different models with a full line of accessories, these detectors measure temperatures from 200°F. up to 7000°F.

For complete information on how Radiamatic Infrared Systems can solve your temperature measurement and control problems, call your nearby Honeywell field engineer. Or write Minneapolis-Honeywell, Wayne and Windrim Aves., Philadelphia 44, Pa. In Canada, Honeywell Controls, Ltd., Toronto 17, Ontario.

Honeywell

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Circle Service No. 12

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- Waste Space
- Mounting Labor Costs
- Late Materials
- Lack of Flexibility
- Cluttered Areas
- Too Long Hauls
- Inaccessibility
- Poorly Integrated Service Areas

with this 314 page manual

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a new book by Richard Muther, *(with a foreword by Allen H. Mogensen)*

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Every manager and technical specialist needs this guide to better layouts. It is the first book specifically designed to show him how to obtain the most efficient layout for his situation . . . in production, office, or service areas.

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Robert S. Rice, nationally known Professional Engineer and Editor says: *"After reading this book one wonders why it wasn't done before; it's such an obviously helpful manual."*

CONTENTS

- The Systematic Layout Planning Pattern
- The Technique of Product-Quantity Analysis
- Optimizing the Flow of Material
- Diagramming Flow and Activity Relationships
- How to Establish Space Requirements
- Making a Space Relationship Diagram
- Modifying Considerations and Practical Limitations
- Evaluating and Selecting the Layout
- Location Considerations
- Installing the Layout
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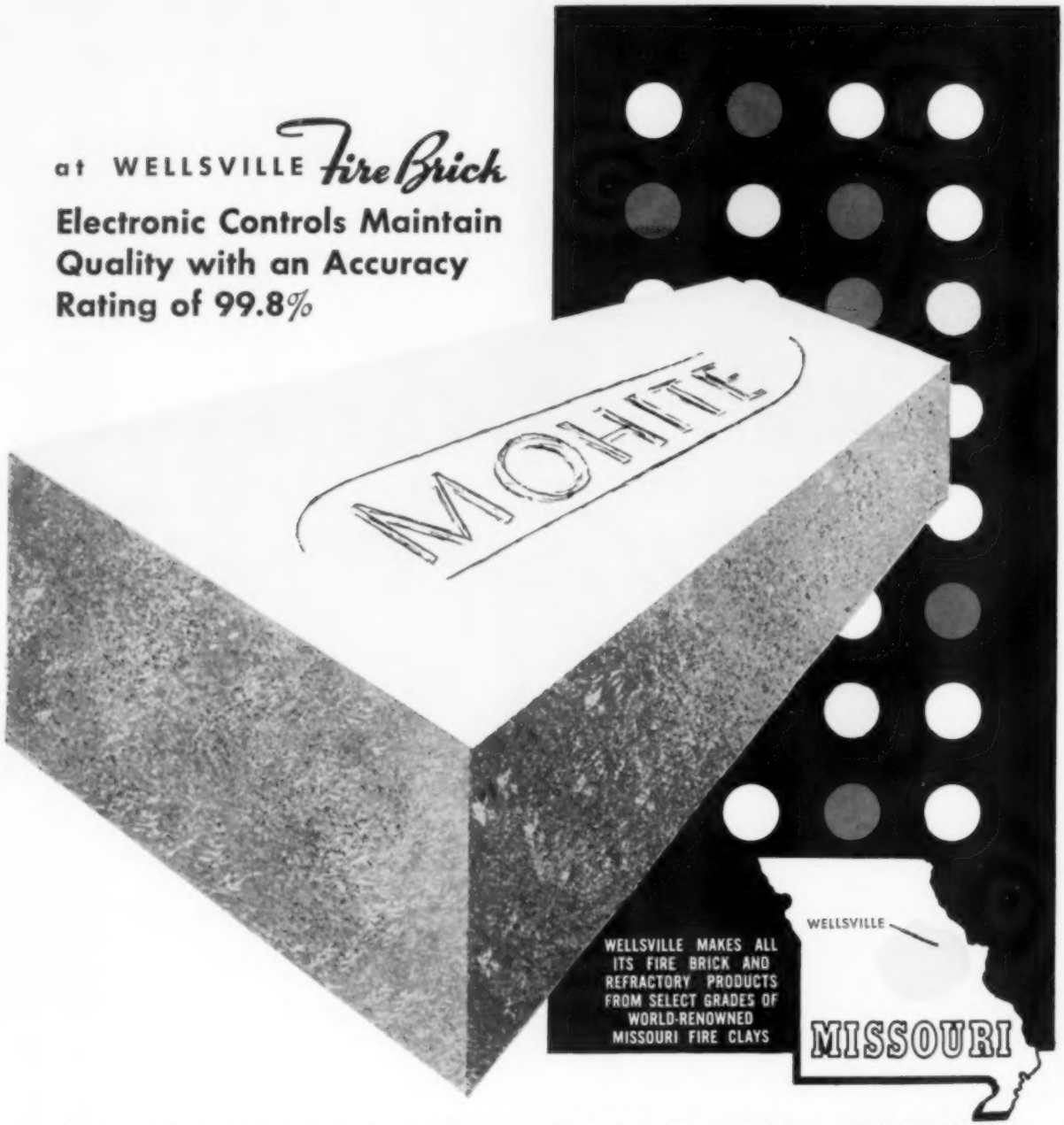
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Improving the quality of its products is a progressive policy at Wellsville Fire Brick Company.

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The Wonderful World of Research

Research Builds Prestige

Any industry today without a research program is not considered a progressive industry. The structural clay products industry itself was considered a backward, slowly dying industry immediately following World War II. With the advent of the research program in 1950 the prestige of this industry immediately began to climb in the eyes of banking circles, building circles and the public in general.

Now, 11 years later the program is widely known, particularly in building circles, and has given brick and tile the reputation of a product going modern very rapidly.

The research program carried with it into prominence all the influences which go into the construction of homes and nonresidential structures. For instance, the cooperation of labor with the research program is something of which both labor and the members of the research program can be proud. Labor has put its shoulder to the wheel and assisted research on many occasions to put over an idea that will make brick and tile structures better for the benefit of the ultimate user. New mechanics, the apprentices, are now willing to study bricklaying because they see a future in the industry.

It is no secret that because the structural clay industry has a research program, many outside laboratories have cooperated with the research group to develop new ideas. Owens-Corning, Dow Chemical, Selas and other large corporations have spent thousands and thousands of dollars, probably equaling the expenditure of the industry itself on research. These thousands of dollars were spent on the structural clay products industry's problems. This is prestige. Without this prestige the industry would have not been given a second look by these large industries. That prestige came through the research program. Every dollar spent by the industry for research is now being matched outside of the industry to be applied to the industry's problems.

The clay product industry's program has been so well founded and organized and thought out that other industries are copying it. At least three, and possibly four other industries, now have similar programs. That too speaks well for the program and the prestige it is giving the industry. It is a compliment to think that an industry which 10 years ago was considered backward and dying should now have its research set up the signal for progress and a pattern copied by other industries.

Although the participation of labor in this program cannot be measured in dollars and cents, certainly the cooperation of the bricklayer, the contractor and the hard material dealer probably far exceeds the investment that was put into the research program by the clay industry. The far reaching effect of the masonry process, of packaging, of the SCR brick, of panel construction and the many innovations researched by this group and put into practice and distributed by labor, contractors and the dealers, has given the clay industry prestige, honor, a face of progress and modernization.

Research Opens Doors

Finally, because the industry has a research program, doors have been opened for those individuals who must go out and sell and introduce clay products. It raises the stature of the salesmen in the eyes of the architect, the designer, the specifier and the contractor. He now can carry his head high and talk about a product with a research program back of it. Architects, engineers and contractors are aware of the accelerated pace of all types of product development through research. Clay products now are not suffering by comparison. Because structural clay products have a research program, the builders avidly look forward to the representatives of the industry so that they may learn what is new and what is better with this marvelous product.

Each member of the SCPRF and, in fact, each member of the industry whether he is a participant or not, should be very proud that the industry has a program which is building such tremendous prestige for the industry and its products.

(*First editorial in a series on research.*)

J. J. Swec

Editor & Publisher

NEWS OF THE INDUSTRY

To Promote Clay Products

Clay Products Services, Inc., is a new organization for the promotion of structural clay products throughout the state of South Carolina. Chadwick N. Heath is executive secretary of the group with headquarters at Columbia, S. C.

The basic program of the association will be direct mail contacts with architects. The executive secretary will be available for consultation with architects and will promote the use of clay products among them. Promotional work with builders and a bricklayer training program also are being undertaken.

Among the objectives of the organization is to double the demand for clay products in South Carolina.

Clay Production Down

May 1961 production of brick totaled 608 million units, compared to 534 million units produced in April and 652 million in May 1960. Production for the first five months of 1961 is down 10% from a like period in 1960.

May production of vitirified clay sewer pipe and fittings, totaling 164,000 tons, was 11% higher than April production. Over the 5-month period, 1961 production is down 6% from 1960 levels.

Structural clay tile produtcion dropped to 38,000 tons in May from 42,000 in April, 1961. January-May 1961 production is down 8% from the total for the same months of 1960. All figures are from the U.S. Department of Commerce.

Elect Nutting, Needler

A realignment of officers and directors of the Thomas Moulding Brick Co., Chicago, Ill., was recently announced. Harold J. Nutting was elected chairman of the board; William L. Needler was elected president and chief officer, and James L. Garard was elected secretary-treasurer.

The changes are the result of new financial interests in the 96-year old firm, as well as the desire of Joseph Moulding, former president, and Arthur Moulding, former secretary-treasurer, to retire from active management.

Fire Destroys Building

Damage of $2,000 to $3,000 was reported recently by the owners of the Consolidated Brick Co., Horseheads, N.Y., where a storage building was destroyed by fire.

Shaw Marks 100 Years

L. E. Shaw Ltd., is celebrating its 100th anniversary this year. The company is now operating eight plants in the Maritime provinces of Canada, five in Nova Scotia and three in New Brunswick. The company recently opened a new plant at Sydney, N.S.

The first Shaw plant was built near Hantsport in Nova Scotia's Annapolis Valley in 1861.

United Names Kiefer

Robert J. Kiefer, formerly in production with Laclede Christy and Georgia Kaolin, has been named division operations manager for the United Brick Co., Kansas City, Mo. The announcement was made by Millard O. Peirce, general manager, United Brick division, American-Marietta Co.

Other changes announced at this time were Arthur Stone as marketing manager and William A. Rush as finance manager.

Acme Brick Reports

The Acme Brick Co., has announced a quarterly dividend of 30 cents a share.

Ligon Receives Award

Elmer R. Ligon, vice president in charge of research for W. S. Dickey Clay Manufacturing Co., at their research center in Pittsburg, Kan., has been presented with an Award of Merit for his work in ceramic research and development.

Cited by Pittsburg (Kansas) College, his alma mater, Ligon received the award from Dr. Leonard H. Axe, president of the college, during recent commencement exercises. Ligon

Marks 70th Year With Robinson Clay

John J. Starr, left, receives a pin for 70 years' service with the Robinson Clay Product Co., Akron, Ohio. W. E. Robinson, company president, makes the presentation. Starr is 93 years old and began with Whitmore-Robinson Co., later merged into the present company, in 1891. He has served the company as secretary, auditor, purchasing agent and treasurer, among other posts. He was named to the board of directors in 1906 and elected vice-president in 1941, a position he still holds. He and his wife observed their 68th wedding anniversary in 1960.

was graduated in 1932 and received his masters degree in 1938.

The award is made for "meritorious achievement", and in the case of Ligon, refers to his spearheading several clay research projects at Dickey and his work with the National Clay Pipe Manufacturers, Inc.

Joins State Commission

The appointment of Barton A. Holl, president, Logan Clay Products Co., Logan, O., to the Ohio River Valley Sanitation Commission was made recently by Governor Michael DiSalle.

Promote L. E. Ross

General Shale Products Corp., Johnson City, Tenn., recently announced the promotion of L. E. (Red) Ross to the position of assistant sales manager of the company. Ross was formerly sales supervisor of General Shale's plant, the Coral Ridge Brick & Tile Corp., Fairdale, Ky.

J. B. (Jake) Kibler was named to the position of sales supervisor at Fairdale.

Fire Destroys 12,000 Brick

An early morning fire recently ruined 12,000 brick at the El Dorado Brick Co., El Dorado, Ark. Also destroyed in the fire were two pieces of heavy equipment and a drying house. Company owners made no exact estimate of damage until damage to the brick mold and other equipment is ascertained, but stated that the loss is expected to be heavy.

Production of brick at the plant is 50,000 daily.

Brick Firm in Production

It was recently announced that the Macon, Miss., plant of the Delta Brick & Tile Co., Inc., has started production. More details of the plant and its equipment will be featured in forthcoming story in this magazine.

Tomlin Heads Acme

D. O. Tomlin, well known Southwest executive, has been named president of Acme Brick Co., Fort Worth, Texas. Tomlin comes to Acme after five years as president of Lone Star Boat Co., Dallas. Prior to his association there, he served as president of Dearborn Stove Co., Dallas, and was treasurer of Briggs-Weaver Machinery Co.

Tomlin will succeed Neill Boldrick, Acme president since 1959, who announced his resignation effective August 15. Boldrick, who has been associated with Acme since 1925, will continue to represent the company as national chairman of the Depletion Committee of the brick and tile industry for the remainder of the year.

S & F Buys Three Firms

Sayre & Fisher Co., Sayreville, N. J., manufacturer of brick and other building materials, has acquired three privately held companies in Bloomfield, N. J.

The companies purchased were the Thor Ceramics, Inc.; the Ignition Components Co., and the Orth Holding Co., a real estate investment company affiliated with Thor Ceramics, Inc.

Texas Firm Under Way

Crush Brick Company, Sulphur Springs, Tex., is now in the production of brick, announced Bill Taylor, owner.

Crush Brick manufactures face brick of fire clay and sells raw fire clay.

Recently the company sold the brick that was used in a round house at Sulphur Springs. "I think this is the only round house that I have ever heard of, or seen," Taylor said.

Watkins Joins SCPI

The Watkins Brick Co., Birmingham, Ala., recently joined the Structural Clay Products Institute, Washington, D.C.

The Watkins Brick Co., is also a member of the Southern Brick & Tile Manufacturers Association, a regional affiliate of SCPI, which includes Alabama, Georgia and Florida.

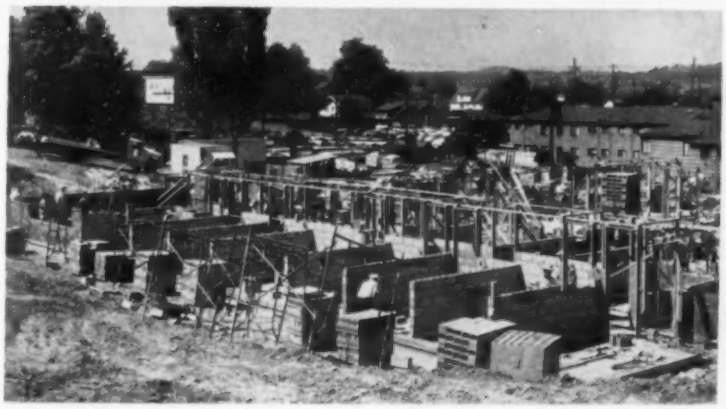
To Talk on Aggregate

J. J. Svec, editor and publisher BRICK & CLAY RECORD will head a symposium on lightweight aggregates and its uses in lightweight clay block. The symposium will be featured at the Pacific Coast meeting of the American Ceramic Society.

On the symposium panel will be Paul V. Johnson, deputy director, Structural Clay Products Research Foundation, Geneva, Ill., who will speak on the SCR process for the manfacture of lightweight aggregate; Owen H. Cross, vice-president, Swindell Dressler Corp., Pittsburgh, Pa., who will speak on drying and firing of lightweight structural clay block; B. C. Miller, president, Miller Equipment Co., Salisbury, N. C., who will speak on kiln operation and production of lightweight structural clay

(Continued on page 29)

Portland UMA Donates Another Building



Members of the Unit Masonry Association, the group which several years ago raised the walls of the Oregon Museum of Science and Industry in a single day, took up construction of a new Portland (Ore.) Child Guidance Clinic as another public service work project. Thousands of dollars worth of labor and materials were donated in the construction of the clinic building, which is almost of all-masonry construction. The UMA is an organization which includes masonry contractors and suppliers as well as members of Bricklayers Local No. 1.

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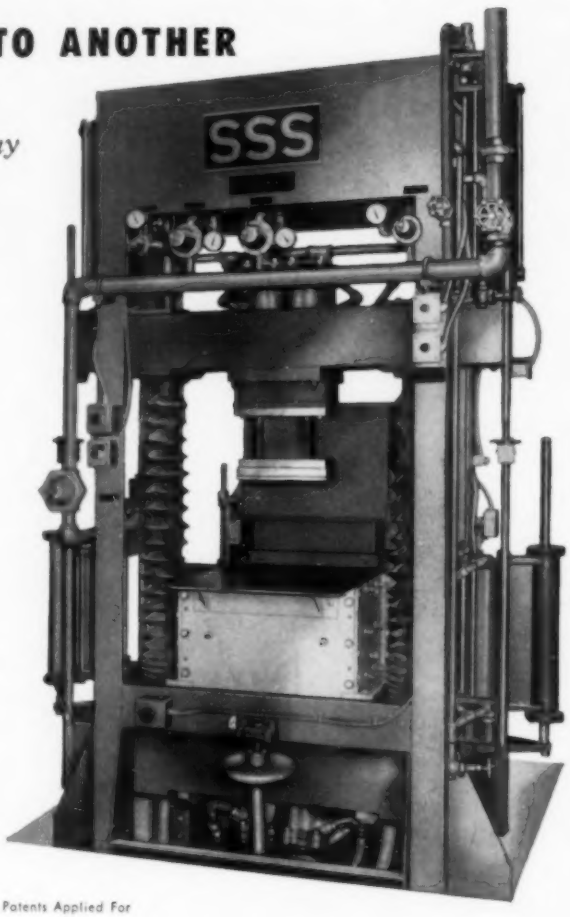

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(Continued from page 27)

block; Norman Small, Columbia Machine Co., will discuss the forming of the block; and Dean Tinker, Ohio Kilns, Inc., who is now building a kiln specifically designed to burn lightweight clay block.

There will be a motion picture of a newly designed plant which is at the present time being constructed in North Carolina. The film will be presented by Neal F. Mohler, ceramic engineer and managing editor of BRICK & CLAY RECORD.

Obituaries

David B. Andrews

David B. Andrews, well known veteran of the brick industry, died recently at the age of 76. Mr. Andrews was president and treasurer of the Bridgewater Brick Co., Bridgewater, Mass.; Stiles & Hart Brick Co., Taunton and South Bridgewater, Mass.; I. L. Stiles & Son Brick Co., North Haven, Conn., and vice-president and director of the Stiles Corp., North Haven.

Mr. Andrews has been a charter member and director of the Structural Clay Products Institute.

Brad Wyatt

Brad Wyatt, superintendent of mechanical joint operations at the Santa Fe Springs, Calif., plant of Pacific Clay Products, did recently at the age of 59.

Mr. Wyatt, widely known in the California ceramic industry, had served as plant superintendent of several Pacific Clay Products plants prior to his Santa Fe Springs assignment. Among many activities, he had been active with both the Northern and Southern California Sections of the ACS.

George W. Dando

George W. Dando, retired vice president of the McLain Fire Brick Co., died recently in Mercer Sanatarium, Mercer, Pa.

Robert M. Moore

Robert M. Moore, president of the United States Concrete Pipe Co., died recently at his summer home in Michigan.

Honor SCPI's Fallout Shelter Program

Frank B. Ellis (left), director of the Office of Civil and Defense Mobilization presents a Certificate of Appreciation to Douglas Whitlock, chairman of the board of the Structural Clay Products Institute, in recognition of the Institute's fallout shelter program.

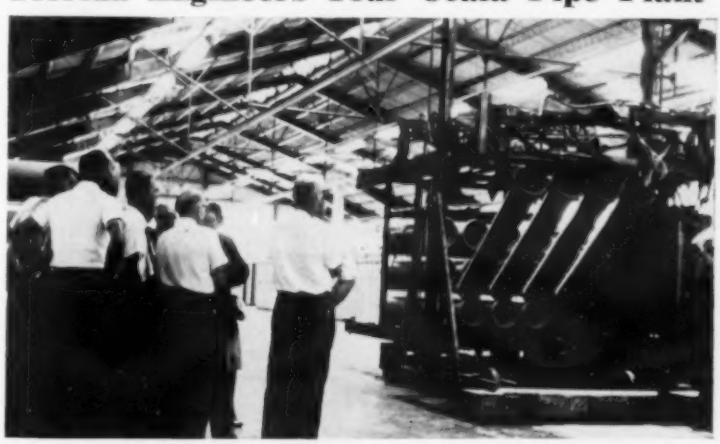
Hommel First Graduate In Business, Ceramics

Richard Hommel has graduated from Alfred University as the first student to complete the nation's first degree program combining a major in economics and business and a minor in ceramic engineering. The course is similar to those in other institutions combining studies in various engineering fields with an industrial management curriculum.

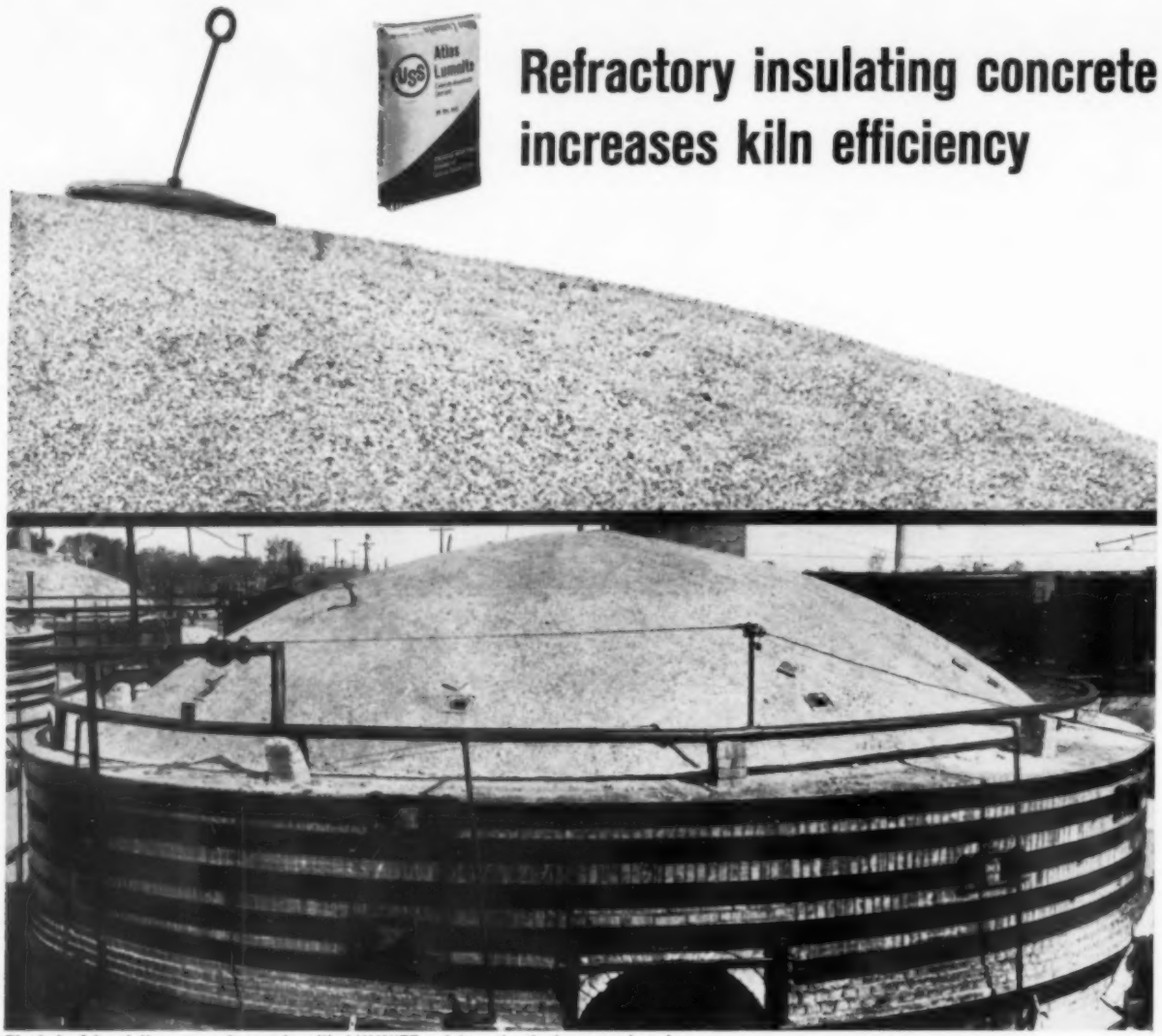
His future program calls for two or three years on an industrial training program with a major firm, and in this regard he has taken a position with the Caloric Corp., Topton, Pa. After that, he plans to do graduate work and then to join his father's firm. His father, Ernest M. Hommel, is president of The O. Hommel Co., supplier to the ceramic industries.

The degree conferred on this pioneering student is the A.B. with a business major. However, the first two years of his studies closely followed the curriculum of ceramic engineering students in State University of New York College of Ceramics at Alfred University.

Florida Engineers Tour Ocala Pipe Plant



The rack unloader is receiving close attention by this group of Florida engineers during their recent tour of the new vitrified clay pipe manufacturing plant recently put in operation by the United States Concrete Pipe Co., Ocala, Fla. Engineers from all parts of Florida were guests of the company at a plant tour and luncheon recently.



Refractory insulating concrete increases kiln efficiency

Blanket of insulating concrete, made with LUMNITE calcium-aluminate cement, cuts heat loss and improves efficiency of periodic kiln at Mason City (Iowa) Brick & Tile Co.

Field reports continue to confirm the substantial savings realized when periodic kiln crowns are topped with refractory insulating concrete made with LUMNITE calcium-aluminate cement. Fuel costs are greatly reduced, burns are more uniform, and ware in bottom courses is burned harder.

Placement of crown insulation is an easy operation: Neat grout of LUMNITE cement and water washed over kiln crown . . . 1 to 4 mix of LUMNITE and Vermiculite (by volume) placed 2" thick over crown . . . several firings later, 1 to 2 grout of LUMNITE and sand applied over crown insulation to provide seal coat for maximum durability and weather protection.

Many brick plants keep a supply of LUMNITE or their choice of castables ready for immediate use. Castables are convenient packaged mixtures of LUMNITE and aggregates selected for specific temperature and insulation needs . . . just add water and mix on the job. Castables are made by manufacturers of refractories. For more information, write Universal Atlas Cement, 100 Park Avenue, New York 17, N. Y.

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Circle Service No. 22

SCPRF News

One new SCPRF activity that will be started next year that was received with particular enthusiasm by the members is the proposed 2-day plant seminar for members' plant personnel. A survey of the membership, prior to the SCPRF membership meetings in June, indicated that there is a high interest in plant problems research. However, there was no agreement on any one or two major plant problems requiring research. Consequently SCPRF's Executive Committee felt that the seminar being planned would, among other things, serve to bring to light those areas of general interest where research is needed for the solution of plant problems common to many members.

The field testing program of the new "SCR corner pole"** is nearing completion and it is expected that license agreements for its production and sale can be consummated in the very near future. Two companies, one the largest producer and distributor of masonry corner poles in the country, and the other one of the leading manufacturers and distributors of scaffolding, are extremely interested in such a contract. As reported earlier, the mason contractors and masons who have used the new poles on a trial basis were unanimous in their praise of the design and its simplicity of erection and use. Many were most helpful in suggesting improvements in the original design which were subsequently incorporated in the poles now being tested.

With the signing of the contract for the installation of a lightweight aggregate furnace for Mapleton Development, Inc., and the near completion of the plant trial program with the Acme Brick Co., the SCPRF Ceramic and Industrial Research Division will soon be able to resume its clay testing program for the rest of its members. This program is set up to determine the suitability of the members' clays for the production of the "SCR veri-lite" aggregate and the production of lightweight ware in which the aggregate is used.*

A year and a half ago SCPRF commissioned Casper Neer, Washington, D. C., architect, to make a thorough study of the "SCR building panel"* and prepare recommendations for its use, aesthetically, in architectural design. Neer prepared a most comprehensive report, profusely illustrated with drawings. In addition to suggesting many ways in which the conventional panel could be used in architectural design, Neer suggested the addition of five special panel unit shapes that would permit the fabrication of panels with "sculptured" or "gross-textured" surfaces, thus producing an interesting play of lights and shadows on the resulting wall surfaces. Such panels, however, could not be fabricated in the present casting jig developed to produce the original panel design. SCPRF has, therefore, designed a new type of casting jig which will allow the economical fabrication of such "sculptured" face panels. A small scale prototype of this new jig has been built and successfully operated at the Research Center. It was demonstrated at the recent Midyear meetings of SCPRF members held in Geneva.

William Lyman, A.I.A., in an article published in the July, 1961 issue of the A.I.A. Journal entitled, "Ten Steps Toward Better Design," stated:

"We (architects) must do a better job of selecting materials. This requires thinking more about people and their need for a tie with nature; new materials have tended to sever this tie. We must keep in mind the two extremes: Using one material in many different ways and using everything in the book."

The natural appearance of clay masonry, properly used, helps provide that tie with nature that Mr. Lyman feels is so important. Also, brick and tile, because of their sizes and variety of colors and textures, lend themselves to use in many different ways. One of the most important responsibilities of SCPRF is the development of new ways in which these products can be used in building construction—thus providing the architect with even greater freedom and flexibility in design using them.

No research organization can attain greater stature in the eyes of other leading scientific and technical organizations in its general field of interest, or the public, than that of its individual staff members or officers. One most effective way for research people to attain and maintain prestige and stature in scientific or technical circles, other than the routine recognition they may receive in connection with the successful results of their work-a-day research activities, is membership and active participation in technical and scientific societies whose fields of interest are akin to theirs. The resultant "rubbing of elbows" with other people in the same general fields of research or building design and construction helps broaden the scope of their thinking and experience, as well as to make their own organization and its work better known.

The management of SCPRF encourages such activities on the part of its staff. Consequently, SCPRF staff people are active members of such leading organizations in the building research, design and construction fields as the American Society for Testing Materials, American Ceramic Society, American Concrete Institute, Building Research Institute of the National Academy of Sciences, American Society of Civil Engineers, Construction Specification Institute and the American Society of Heating, Refrigerating and Air Conditioning Engineers.

*Reg. U.S. Pat. Off., SCPRF
**Reg. U.S. Pat. Off., Pat. Pend., SCPRF

Corhart Reports Research

Norman J. Vang, vice president of manufacturing for Corhart Refractories, Louisville, Ky., said at a banquet honoring the local firm's veteran employes that the company spent 10% of its sales income on research and development of new products during 1960. The percentage was one of the highest in the country, and Corhart will spend even more during 1961, he added.

Capital expenditures at the firm's two Louisville plants will be an estimated $2,500,000 this year, he said. Edward C. Leibig, president, said Corhart is competing for a share of the $412,000,000 spent for refractories used in the glass, steel and cement industries. The national figure should reach $700,000,000 by 1965, he added.

Carborundum Modernizes

The Carborundum Co. has announced a $1.5 million modernization and expansion of its Globar Electronics plant at Niagara Falls, N. Y. The project is to provide increased production capacity for present lines of nonmetallic heating elements and other products, greatly improved precision control of manufacturing processes, facilities for manufacturing new product lines and improvements for the technical department.

The Globar Electronics plant is a branch of Carborundum's Refractories Division.

To Honor Dr. Heuer

Dr. Russell P. Heuer, vice-president of General Refractories Co., will receive the Francis J. Clamer Medal of the Franklin Institute, Philadelphia, on October 18. Dr. Heuer will be honored for his development of a superior basic brick, primarily a mixture of magnesite and chromite, which could withstand a much higher furnace temperature than previous types in use. That brick and its offspring inventions have materially increased the rate of United States steel production.

The medal is awarded at least once in three years for meritorious invention, discovery or research achievement in the field of metallurgy.

Porter Names Crandall

Eugene R. Crandall has been appointed head of mullite operations, Shelton, Conn., works of the H. K. Porter Co., according to a recent announcement by J. P. Raugh, the division's vice-president and general manager.

Montgomery Appointed

Edward A. Montgomery, vice president and general counsel, Carborundum Co., Niagara Falls, N. Y., was recently appointed to the board of directors of the United Community Chest.

Davis Elects Eusner

George R. Eusner, former chief of refractory and mineral technology division, United States Steel Corp., at Monroeville, Pa., has been elected executive vice president of the Davis Fire Brick Co., Oak Hill, O.

Faust Joins Electro

Ernest H. Faust, Jr., recently joined the research staff of the Electro Refractories & Abrasives Corp., Buffalo N. Y., according to a recent announcement by G. J. Easter, director of research.

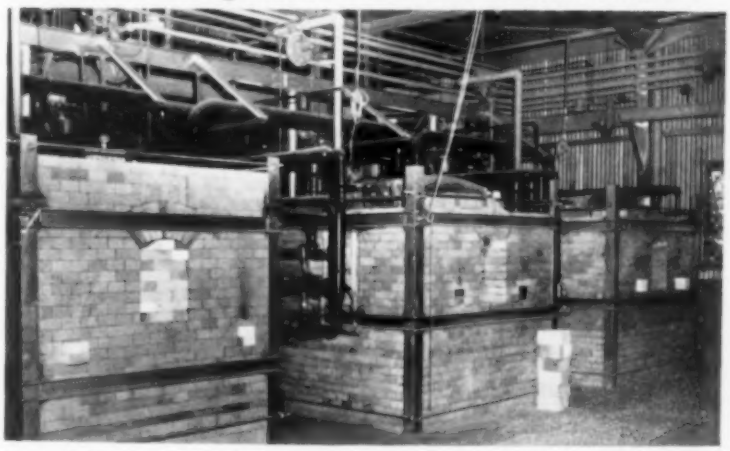
Promotes Hauth

R. S. Moore, general sales manager, Harbison-Walker Refractories Co., Pittsburgh, Pa., recently announced the appointment of Charles R. Hauth as assistant manager, technical sales.

Dixon Elects Directors

The Joseph Dixon Crucible Co., Jersey City, N. J., recently re-elected seven members of the board of directors at the annual stockholders meeting. Also at the meeting, the stockholders were told that net sales and net income were slightly less in 1960 than in 1959. In 1960, net sales showed $17,680,463 as compared to $17,951,906 in 1959.

Kaiser Completes New Technical Center



Three of the furnaces used for testing experimental refractories at Kaiser Refractories' new Technical Center at Mexico, Mo.

Kaiser Refractories has completed its new Technical Center at Mexico, Mo. The new laboratory houses research, development and raw materials department personnel.

The Center has the latest equipment required in developing new or improved fireclay, silica and high alumina refractory brick and specialties and to process the variety of raw materials required to make these products. Within its 17,300 sq. ft. are office spaces, a testing furnace building, a general lab building and a basement which contains a meeting room and lockers.

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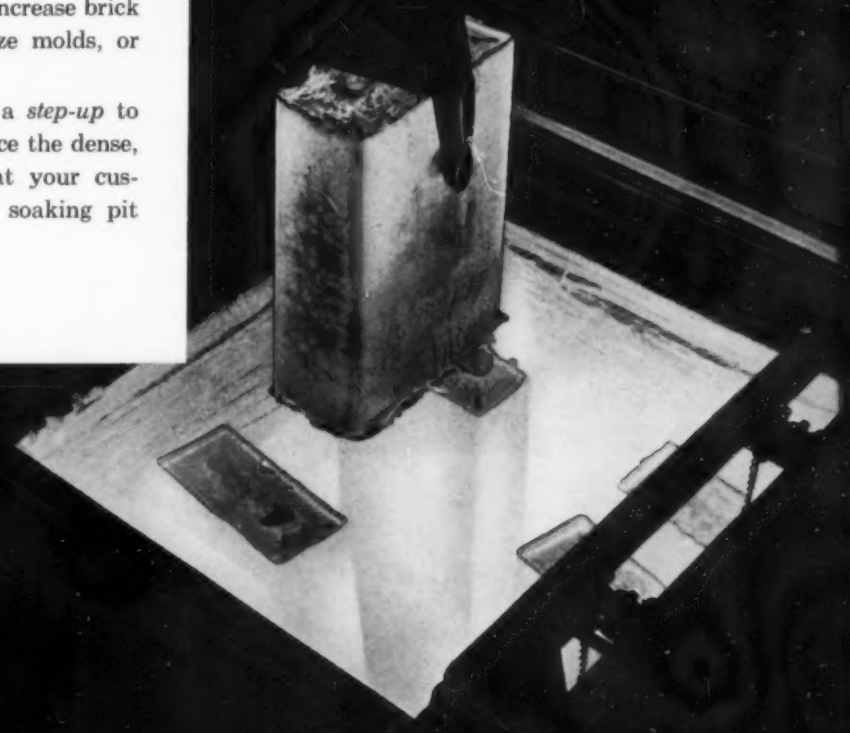
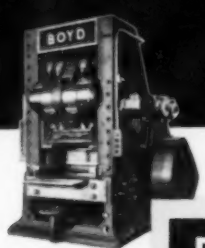


Photo courtesy of Republic Steel Corporation.



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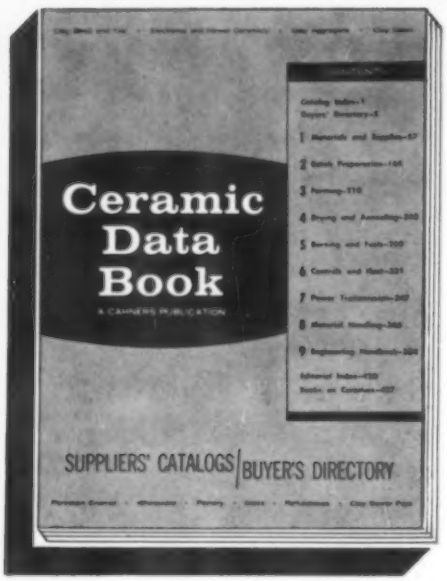

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Solve Your Problems in

Heating and Cooling

It is the privilege of the editors of BRICK & CLAY RECORD to present herewith the last paper written by L. R. Whitaker, president of Carolina Ceramics, Inc., Columbia, S. C., before his recent death. Ample evidence is provided here of Mr. Whitaker's keen insight into production problems and his clear and logical solutions based on broad experience. We also call your attention to the front cover of this issue, which pictures a beautiful example of artistry in clay products as produced by Mr. Whitaker's company, Carolina Ceramics.

By L. R. WHITAKER

In this study of tunnel kilns, the main idea has been to make an attempt to direct the heat and air directly to the points where it is desired. In the drying of ware in a continuous dryer and with large packages, the operators, in attempting to get fast drying, are faced with the problem of condensation in some section of the set, especially in cold weather, by means of changing ports, volume of air, degree of humidity, baffles and other methods. Many times, these points of condensation of too fast drying can be moved from one section of the set to occur in other sections of the set.

A great deal of thinking in regard to production in tunnel kilns is necessary at this time when interest is very high in regard to producing large cheap units to compete with concrete block.

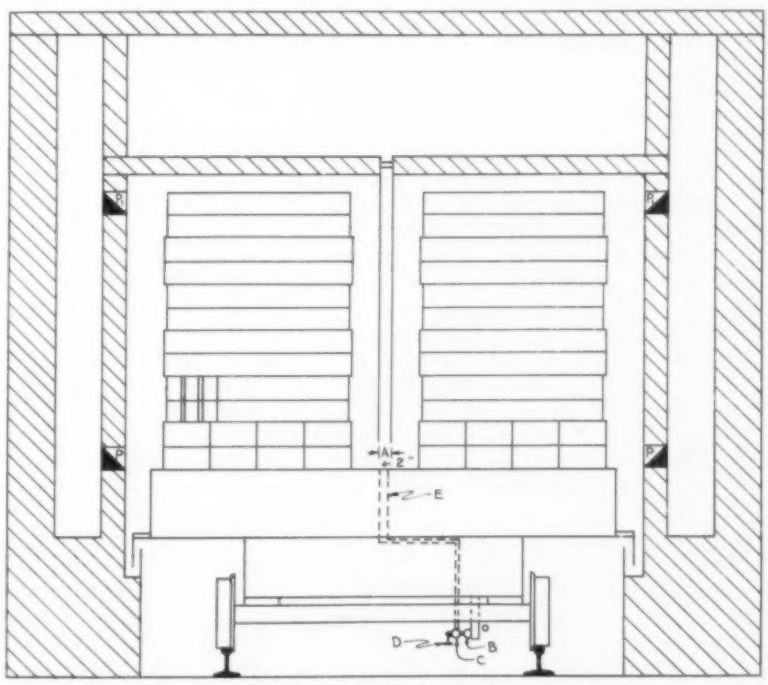
High Humidity on Cold End

When a dryer is on a fast schedule there are large volumes of wet air generated and this air gives a high humidity on the cold end. This high humidity is conducive to condensation, especially in a car with a heavy tonnage; perhaps on some isolated internal section of the set where there is no movement of air. An easy method to prevent this condensation is to heat the brick to some temperature above that of the cold end of the dryer, with little evaporation.

A method suggested to carry air to the inside of the set is suggested in Drawing No. 1, with a channel marked A that runs the entire length of the dryer with an opening in the center of the car. This panel will direct the flow of air to some point near the car deck.

The air from panel A which is under a positive pressure can be directed to ports P and ports P_1 for recirculation or exhaust. This method is suggested to give a more positive recirculation and also to give a more uniform temperature of brick on entering the kiln.

This panel in the center of the car offers a means of forcing hot air to bottom of the set in the preheat zone of the tunnel kiln. In some kilns there is a heat drop on the car deck after the cars leave the dryer and enter the kiln. Several methods are now in use to heat the bottom centers of cars such as top, bottom, sides and cross circulation; also, excess air burners to deflect heat to the bottom center of cars. These panels would



Drawing No. 1. Drying-Preheat Train Line.

offer a direct method of placing heat at the bottom center of the car by taking air from a hotter section of the kiln. Fans could direct the heat through these panels to a temperature of 1400°F. By the use of high temperature fans and the panels made of high temperature sheet steel, the center bottom of the car would be subject to a controlled method of direct heating. With the inside and outside of the set at the same temperature the kiln schedule would be speeded up.

Efforts in Underfiring

At this time there is a great deal of effort being directed toward firing into the super deck under the floor of car. There have been some very interesting installations made for underfiring in the tunnel kilns which have contributed to our knowledge of firing. This underfiring has been directed by baffles and tunnel burners placed in the sides of kiln.

To give a more direct placement of heat to the car floor a method is suggested by which the burners are placed in the floor of the car. In drawing No. 1, item B, there is a gas conduit attached to each car. At each end of this is an air line coupling of the check unit type which positively shuts off the gas when uncoupled, carried underneath the car much the same way as the air line of a railroad car. The gas passes into the header line C through the valve D into the deck of the car through passage E. By means of the above mentioned panel, the center of the car will have a temperature above 1000°F at which temperature the gas will ignite to furnish heat on the car floor. By means of a shoe the valve D can be made to open to a controlled amount of gas.

Attach to Gas Line

A car entering the kiln will be attached to a flexible gas line and cars already in the kiln will connect to other cars by the air line couples. If air is needed for this bottom burner an air line could be added. If necessary a high tension electric spark could insure ignition. This idea may not be too far fetched when it is realized that certain types of periodic kilns have this apparatus in the floor.

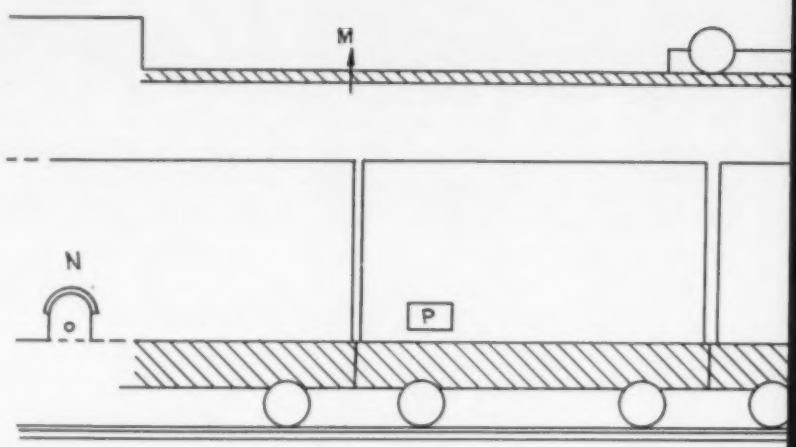
The cooling of ware in kilns has always been somewhat of a problem. However, in continuous railroad tunnel kilns on fast schedules, cooling has, in many cases, slowed down the operation and given ware that was cracked or dunted, usually on top and around the edges of the set.

When the ware on top of the set does not have a clear ring like ware on bottom or inside of set, it indicates that somewhere in the cooling the top was subject to some chilling at a temperature that was different from the bottom or center. The bottom of the set on almost any kiln will cool in less time than the top; then it was not a question of cooling time.

Rapid and Slow Cooling

In the cooling of ware it is fairly well established that the points of rapid cooling must be from the finishing temperature down to 1500°F; the cooling must be slowed down from 1500°F to 700°F, and it then can be speeded up again from 700°F to atmospheric temperature.

The natural tendency is for the cooling air to travel vertically, but under present conditions if the air in the cooling zone is drawn from a position M, a great deal of the air will be drawn from the firing zone N. To prevent this flow of air from the firing zone, the cooling air is drawn from some position P.



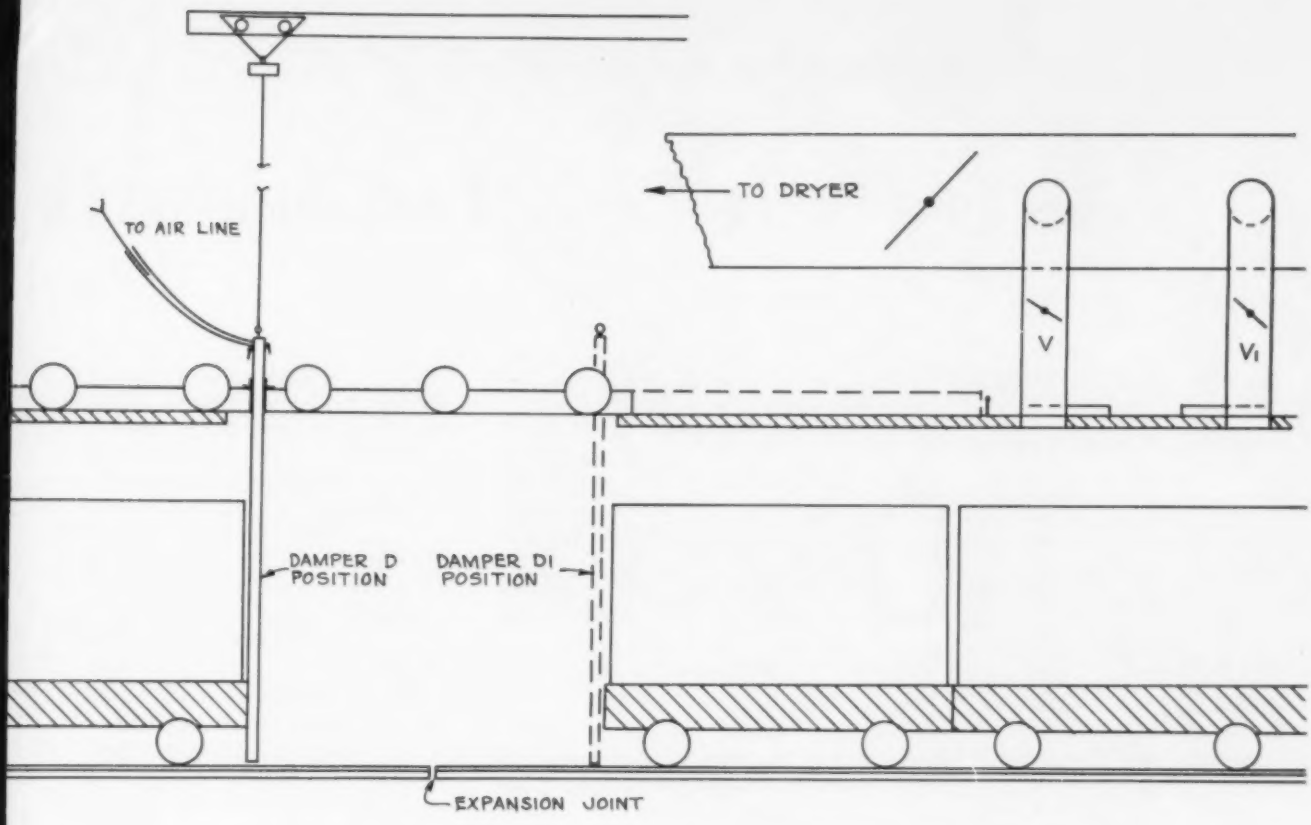
Drawing No. 2. Cooling Section.

Balance of Draft Conditions

Even when drawing air from position P, a careful balance of draft conditions must be maintained, or the burning heat is drawn into the dryer or cold air into the furnace zone.

The ware in the cooling zone is chilled on the outside of the set; after passing the cooling air ports the outside of the set becomes preheated by the hot ware in the center of the car, and when no control is made, the top and outside ware will not pass through the necessary controlled cooling cycle.

It appears that if the cooling of the ware could be accomplished in a separate section, natural vertical convection would allow for more effective cooling by controlling the vertical flow with outlets at V, V1, V2, etc.



With the above in mind, the idea for a movable damper is presented as shown in Drawing No. 2. At some distance from the furnace zone and down into the cooling zone, the top is left off for a distance slightly more than the length of a car. This gap in the crown is covered by a high temperature steel jacketed cover; a stream of cooling air passes through this cover. The jacket rolls on wheels and is kept tight by a sand seal.

Two-Section Cover

There are two sections of this cover with a cooled jacketed damper so that a section of the top always covers the gap in the top of the kiln. The damper moves with the car after a gap in the cars is made by pulling this gap directly below the gap in the crown. The damper is placed in position D and moves with scheduled push to position D_1. When the damper reaches D_1, the cars are pulled, damper raised, and placed to position D where the cycle is repeated. In this positive seal between the kiln draft and cooling draft, the draft on the kiln will be independent of the waste heat draft. Also, the cooling conditions can be independent of the kiln draft and better cooling conditions can be provided by allowing the ware to cool under more natural conditions.

Kaiser Licensing Pact

Kaiser Refractories & Chemicals Div., Oakland, Calif., has announced that it has concluded a licensing agreement with Ceramica Olivos S. A., Buenos Aires, Argentina, for the manufacture of refractory specialty products.

The South American firm will produce these products at its Buenos Aires plant. Ceramica Olivos S. A. has been manufacturing high quality refractories, particularly special refractory shapes, for nearly twenty years.

Under the terms of the licensing agreement, Ceramica Olivos S. A. will manufacture and market in Argentina a line of fire clay specialties including plastic refractories, castables, mortars, cements, coatings and insulating materials. All products will be manufactured under Kaiser trademarks, formulae and quality control methods.

High quality raw materials from Argentina and from other world sources will be used for the production of fire clay, high alumina, sillimanite and other specialty products.

Kaiser Refractories laboratories and research facilities will provide Ceramica Olivos S. A. with the same technical services for developmental work, manufacturing and quality control which are furnished to Kaiser plants in the United States.

President of Ceramica Olivos S. A. is Bernardo Fainberg. Juan Carlos Elizalde is plant manager; Raul Navarro is production manager; and Rolando Daulte is sales manager.

Kaiser Refractories is a Division of Kaiser Aluminum & Chemical Corporation.

Murray Joins Louisville

Thomas F. Murray has joined the Louisville Fire Brick Works, Louisville, Ky. as a ceramic engineer.

'Clay Bonded Block' a Misnomer

Why Not Call It Ceramic

By ROY B. MOFFITT

Department of Engineering Research
North Carolina State College

There has been much interest shown by the structural clay products industry in the "so-called" clay bonded block. This interest has resulted from the belief that such ceramic units would have several distinct advantages and could compete economically with conventional concrete blocks. A ceramic unit of concrete block geometry would have two distinct advantages over concrete block.

First, a ceramic unit does not undergo the undesirable volume change which is encountered with concrete block after they are in a structure; and, second, they do have the natural coloring of structural clay units. Also, various shades of most any color can be permanently fired onto a ceramic body at low cost. The aesthetic value of the natural and artificial coloring has been widely accepted by architects, builders and the general public for many years; therefore, this could be an important factor in marketing large size structural ceramic units.

Competitive Ceramic Units

These and other factors have led to the development of textured, lightweight, dimensionally stable, ceramic units that are adaptable to mass production techniques and are competitive with concrete block of similar size. Economically competitive ceramic units having the desired physical characteristics have been produced in the laboratory as well as in pilot plant and commercial operations. However, it must be stated that if conventional or slightly modified concrete block machinery is used to form such a ceramic unit, there is *generally* an insignificant amount of clay associated with a practical and successful composition. This suggests that the name clay bonded block is a definite misnomer and *should be avoided*. By using such a misnomer, interested investigators might automatically make the erroneous assumption that clay has to be a significant part of a practical body composition. The name *ceramic block* is suggested as a more concise and accurate term.

Definition of Clay

The definition of clay contains three separate and distinct specifications. The material must (1) be of a certain mineralogical composition, (2) be of a certain particle size, and (3) be plastic upon the addition of water. The property of being plastic is completely incompatible during the forming stage with conventional or slightly modified concrete block machinery. Clay is usually associated with an anticipation of shrinkage and possibly a slick surface on the ware in the dried and/or fired state. Both of these undesirable characteristics result from the particle size requirement as described by the definition of clay.

Shrinkage and a slick ware surface are not in keeping with the expressed purpose of a dimensionally stable ceramic unit possessing a textured surface. Furthermore, it certainly would be anticipated that forming a body the size of a concrete block made partially or wholly of clay would be difficult. To form a clay body of concrete block geometry sufficiently free of strains in the dried or fired ware would be very difficult. It is therefore apparent that there should be little or no clay in what has been called a clay bonded block.

Usually Some Clay

It cannot be denied that there is usually some small amount of clay in any ceramic body of concrete block geometry. Most ceramic block compositions contain some amount of weathered shale, and shale by definition is consolidated clay or clay-like particles. In a weathered shale there are bound to be particles of clay present. However, the composition as a whole cannot be plastic in any manner; therefore, any clay particles that are present cannot be in such quantity so as to manifest themselves by creating any apparent plasticity in the mix.

To manufacture a textured ceramic block with the same or similar geometry as conventional concrete block, possessing the physical properties inherent in a ceramic product and economically competitive with similar products, several basic "rules" or guiding principals are hereby proposed. These rules are based on two assumptions: (1) conventional or slightly modified concrete block machinery is to be used in forming and (2) conventional type tunnel kilns commonly employed to fire face and/or common brick are to be used to fire the ware.

Compatible with Machinery

Rule number one states that the physical nature of the composition used must be compatible with the inherent forming demands of concrete block machinery. To be specific, this rule can be expanded to suggest that the mixture used can be either "harsh" or slick to the feel, but not in any sense plastic or gummy. A harsh mixture is one that contains a predominate percentage of gritty particles and has *no apparent plasticity*. On the other hand, the composition can be slick or greasy to the feel in the same sense as the minerals talc, pyrophyllite or sericite and still be compatible with the forming machinery.

Experience with both gritty and slick compositions has shown that

Block?

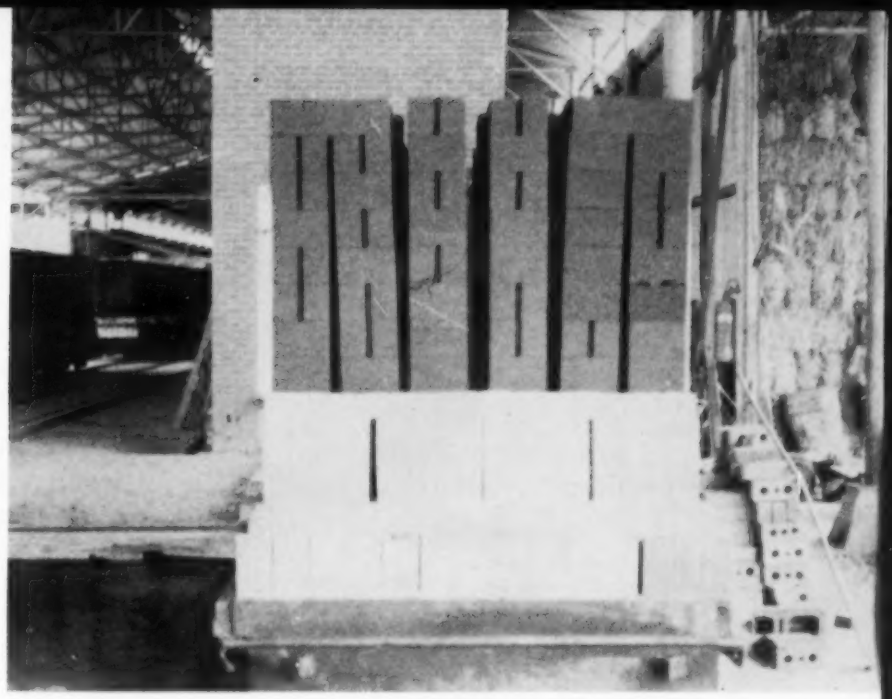


Fig. 1. Kiln car loaded with ceramic block emerging from tunnel kiln. See text.

the texture, absorption, shrinkage and compressive strength of the fired ware demand a particle size and distribution with gritty compositions slightly different from those using slick but nonplastic materials. The term slick or greasy is not to be confused with plasticity in any way. To the feel, materials can be slick without being plastic; sericite, prophyllite and talc are three good examples.

Provision for Dry Strength

Rule number two states that some provision must be made so that the ware will have adequate dry strength. Small percentages, ½ and ¼ per cent by weight of conventional organic binders are sufficient for this purpose.

Rule number three states that the water content of the composition must be adequate to insure the required compressive strength, absorption, and texture in the fired ware. The water must not be enough to allow excessive migration of the fine particles, usually the —35 mesh fraction, from the inside of the body to the ware-mold interface during forming. This migration results in a slick surface, high compressive strength, low absorption and increased shrinkage in the fired body. The water content of the composition is a compromise between the texture requirement, maximum absorption, desired limit of shrinkage and minimum compressive strength in the fired state.

Water Content Varies

This water content will vary slightly from composition to composition depending on the type of aggregate used, lightweight or otherwise, and the particle size and distribution present in the entire mix. It is therefore simply a function of the total surface area of the particles present in the composition. Shown below is a sieve analysis of a typical successful and practical composition that required nominally 12% water by weight to achieve all of the desired properties that have been previously discussed:

Mesh-Tyler Standard	*Per Cent Retained*
−6+8	0.25
−8+10	12.47
−10+14	22.70
−14+20	18.54
−20+35	20.17
−35+48	4.25
Pan	21.62

Suitable for Mass Production

Rule number four states that the final composition must be so pyrochemically designed that mass production techniques can be employed with a resulting low percentage of nonsalable ware. This rule implies many things to many people, but if it is assumed that the ware is to be fired in a conventional tunnel kiln which was originally designed for the firing of face or common brick, then certain basic considerations can be mentioned.

Primarily, the composition must be so designed from materials of a gritty and/or slick nature, *but not plastic*, that it can be fired in a commercial kiln. Almost automatically, this excludes materials high in quartz and lime content, and suggests simple and complex aluminum silicates. However, this does not exclude other possible ceramic raw materials such as talc, etc., that are not aluminum silicates but pyrochemically compatible.

To use mass production techniques, one must be able to hack the *ceramic block* as high as the kiln will allow. For example, one conventional 6-brick wide tunnel kiln used in the pilot plant trials allowed a stand of eight ceramic block during firing with no significant deformation. Figure 1 shows a kiln car loaded with *ceramic block* emerging from a tunnel kiln. Each block was nominally five inches high and weighed approximately 18 pounds in the fired state. The ware must be formed from a composition so designed that there is insignificant deformation during firing as a result of load. This composition should also be so compounded that the fired ware has a low percentage of linear shrinkage. If these two characteristics, insignificant load deformation and low shrinkage, can be achieved, then the requirements of a dimensionally stable unit have been satisfied. *This can be accomplished.*

Achieve Given Cone

It is assumed that the kiln in question will be fired in such a manner that a given cone will be achieved on a predetermined schedule. Then the material that might be classified

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as, or called, the bonding component must have an individual P.C.E. equal to or only one cone greater than the cone achieved by the kiln firing schedule. By the way of an example, if a given material has a P.C.E. of four and is designated as the bonding component, then the kiln firing schedule should be so arranged in order that cone four will be achieved.

The optimum amount of bonding material in the composition is approximately 3/8 by volume; the balance of the composition, 5/8 by volume, is comprised of a material that may be designated as the more refractory phase. This portion of the composition must be made up of a material that has an individual P.C.E. approximately a minimum of eight cones more refractory than that of the bonding material.

This is a generalized description of an optimum composition from a pyrochemical viewpoint, and some liberties can be taken with this rule. The more refractory phase, which has a P.C.E. approximately a minimum of eight cones more refractory than the bonding material, is assumed to be substantially responsible for the resistance to load deformation during firing and the correspondingly low firing shrinkage of the ware.

The pyrochemical reaction in a textured *ceramic block* probably is not a simple matter of glass formation alone. Sintering as well as glass formation probably creates the bond between the individual particles during firing. The relative amounts of bonding that occur by glass formation and sintering might be anticipated by the texture requirement of the unit. Texture demands that the large particles be aligned and distributed so as to form a rough surface and a corresponding open body. The insignificant amount of shrinkage and load deformation during firing suggest an appreciable amount of sintering in the ware. The smaller particles have more surface area contact and higher free energy than the larger particles; therefore, it is probable that glass formation is primarily associated with the smaller particles.

It cannot be denied that eutectics can and do exist in the composition during the pyrochemical reaction. However, the two facts, insignificant deformation of the ware during firing as a result of load and low linear shrinkage, strongly suggest certain possibilities. One possibility is that the eutectic melts are a minor part of the pyrochemical reaction. Another possibility is that if an appreciable part of the pyrochemical reaction is made up of eutectic melts, these melts are so viscous that no deformation as a result of load during firing or appreciable linear shrinkage is apparent.

Inasmuch as the composition is compounded from heterogeneous raw materials, it is not logical to assume that melts possessing extraordinarily high viscosities are formed. Melts of high viscosities would have to contain abnormally high percentages of aluminia or silica. This is not the usual case in the specific type of materials previously discussed.

Commonly, some small percentage of weathered shale is used in block compositions along with aggregates of varying physical and pyrochemical properties. The weathered shale gives some small measure of green and dry strength, lubricates the mold-ware interface, and helps produce a definite brick red as the fired color of the ware. However, this use of weathered shale is not absolutely necessary inasmuch as the functions that this material performs can also be accomplished by using unweathered gritty shales with a slightly modified particle size distribution.

This adjustment of the sieve analysis is simply the rearrangement of percentages within certain mesh fractions. The previous sieve analysis is typical of a successful and practical composition using lightweight aggregate, brick grog and weathered shale. The major contribution that can be attributed to the weathered shale is that it permits the easy forming of sharp corners. Without the weathered shale the corners fray upon ejection from the mold.

Mesh-Tyler Standard	*Composition Containing All Gritty Materials Per Cent Retained*	*Composition Containing 12% of Weathered Shale Per Cent Retained*
−6+8	0.45	0.45
−8+10	12.26	12.47
−10+14	19.48	22.70
−14+20	17.59	18.54
−20+35	29.49	20.17
−35+48	12.26	4.25
Pan	8.47	21.62

Table I. See Text.

Adjustment Necessary

The sieve analysis comparison in Table I shows the slight adjustment of particle size distribution necessary to form a desirable ceramic block from materials that are entirely gritty or harsh and have no plastic or weathered materials in the composition. The major difference between the two sieve analyses is the slight increase in the −20+48 fraction and the sharp reduction in the −48 mesh fraction when 100% gritty unweathered materials are used.

In any discussion of compositions from which a textured body is to be made, it is assumed that the water content is appropriately adjusted so as to make a textured body possible under the given forming conditions. Most any body composition of a given sieve analysis can be so "loaded" with water that only slick bodies will form on concrete block machinery. It must be emphasized that the water content greatly influences the texture, absorption, shrinkage and compressive strength. Therefore, any composition, regardless of its sieve analysis, must be compatible with the water content if a desirable balance is to be achieved between physical and aesthetic properties.

In conclusion, it has been suggested in the previous discussion that to satisfy the demands of economic competition and the ASTM Specifications for Concrete Block, clay is not an absolute requirement in a practical *ceramic block* composition. In fact, appreciable percentages of

(*Continued on page* 63)

Howard West, Illinois Clay Products Co., left, and R. J. McCarthy, Wellsville Fire Brick Co., smile for the B&CR camera.

New TRI president R. W. Knauft, left, discusses Institute business with J. B. Arthur, retiring president.

TRI Elects, Adds New Members

Knauft Becomes President; Report Progress on Research Projects

Robert W. Knauft, president of the Chas. Taylor Sons Co., Cincinnati, Ohio, a subsidiary of National Lead Co., was elected president of The Refractories Institute at the annual spring membership and board of directors meetings held at the Greenbrier, White Sulphur Springs, W. Va., June 22 and 23. He replaces J. B. Arthur, founder of Mexico Refractories Co., who has served for the past two years.

Also announced at the meeting were four new members: Vesuvius Crucible Co., Pittsburgh, Pa.; Ipsen Ceramics, Inc., Pecatonica, Ill.; Georgia Kaolin Co., Elizabeth, N. J., and J. C. Steele & Sons, Inc., Statesville, N. C.

Newly elected directors of the Institute are W. F. Godejohn, Gladding, McBean & Co.; Winston A. Porter, the Globe Brick Co., and Myron E. Morgan, Cedar Heights Clay Co. F. H. Laube was re-elected treasurer and Avery C. Newton, executive secretary.

L. J. Trostel, chairman of the Technical Advisory Committee, and S. M. Phelps, director of the Refractories Fellowship at Mellon Institute, presented detailed reports on technical and research matters including progress reports on the development of the castable mixer and meter and the pressure measuring cells designed to measure the force exerted at different locations within the brick during forming. Additional work is planned to extend the range of usefulness of pressures up to a level of 16,000 psi.

General Counsel W. J. Kenney reviewed the current status of percentage depletion.

R. A. Barr, Babcock & Wilcox Co., left and J. J. Duggan, Walsh Refractories Co., keep their eyes on convention activities.

Obviously enjoying the proceedings are C. W. Enyert, The Bonnot Co., left, and G. T. Needham, Oak Hill Foundry Co.

Breakthrough in Lightweight Program

Research Shifts Into High

SCPRF pulls throttle wide open for "full speed ahead" research program. Foundation lists seven major projects for coming year, concentrates on new product and plant research. Completion of existing projects in sight as group holds 12th annual midyear meeting.

The labs at the Structural Clay Products Research Foundation in Geneva, Ill., were bursting with enthusiasm on June 22 and 23 when members of the Foundation attended the 12th annual midyear meeting. In addition to reviewing the research progress made in the past year, Robert B. Taylor, director of the Foundation, announced a 7-point program on which SCPRF will concentrate in the coming year.

A. C. Frisk, chairman of the Foundation, opened the meeting by expressing his thanks to the membership for the enthusiasm and cooperation which the organization received during the past year. He then described the "breakthrough" in the research lab's lightweight program by announcing the new lightweight aggregate plant to be installed by the Mapleton Development Corp., Minerva, Ohio. This company has just contracted for the building of a furnace similar to the Selas furnace in Geneva for the manufacture of "SCR veri-lite."* The Mapleton Development Corp., a joint venture of Stark Ceramics and Metropolitan Brick Co., will manufacture lightweight clay products from the aggregate.

Lightweight Trials Successful

Paul Johnson, deputy director of SCPRF and manager of the Ceramic and Industrial Research Division, then explained further about the Mapleton project and reported on the progress of the lightweight program at Acme Brick Co. To date the plant trials at Acme's Bennett, Texas, plant have been successful and additional plant tests at their Malvern, Ark., plant were to have been completed by the middle of July. Extrusion tests, using vacuum pugging, with Acme's material and SCR aggregate shipped from SCPRF, have been successful. These tests were made at Pine Hall Brick & Pipe Co., Winston-Salem, N. C. since they had the necessary vacuum equipment.

Johnson then reviewed the work using SCR aggregate for dry pressing 8 x 8 x 16 clay units and mentioned they had obtained good results. In striving for a reduction in weights of the units along with minimum compressive strengths of 1000 psi, the most recent units made weighed 27 pounds each and had average compressive strengths of 1600 psi. Johnson then illustrated this point to the members attending by crushing a unit in the Foundation's compression testing machine. The unit broke at 1800 psi.

Aggregate made from the same clay from which Chicago common brick are made was mixed with Chicago common clay as a binder and 8 x 8 x 16 units were pressed. The resulting unit weighed only 22 pounds, but had a compressive strength of only 400 psi. By adding 5% borax as a flux to the mix, compressive strength was increased to 875 psi with no change in weight.

More Results

William G. Temple, president of Denver Brick & Pipe Co., Denver, Colo., reported on the results of his company's initial small scale lightweight plant trial. Using a mixture of 50% SCR aggregate and 50% binding clay, his company extruded 2000 brick for a trial. The brick were quick dried and quick burned

The method of casting the SCR building panel was given great attention as indicated by this photograph.

*Reg. U. S. Pat. Off., SCPRF

Leonard Kirsten, Public Relations Director, SCPI, Washington, D. C., (left) and Tom Butler, Jr. (center), look over the news articles with Cecil Frisk, chairman, Board of Management, SCPRF, and Mason City Brick and Tile Co., Mason City, Iowa.

in both periodic and tunnel kilns. The tunnel kiln treatment resulted in a 3.1-pound brick (25% less than his standard brick) with 7000 psi average compressive strength and 900 psi average modulus of rupture. The average absorption using the 24-hour cold water test was 6½%, with 11% absorption using the 5-hour boil test.

Fred Blosser of Stark Ceramics reviewed the Mapleton project and the problems which were encountered. One of the things discovered during the plant trials was the fact that the SCR aggregate absorbs and dissipates heat quite rapidly, which is the basic reason for any difficulty in extrusion. However, after much experimentation, proper pugging conditions were developed and extrusion of a satisfactory column was accomplished. Using this system with a mix containing about 40% aggregate, Stark made 40 tons of 8W glazed ware, wet glazing the column. The resultant ware weighed 20% less than the standard ware.

It was immediately discovered that less heat was required to dry the ware and also to fire it. Through prior experimentation it had been found that the ware could be fired in 24 hours, but to be on the safe side, a 38-hour firing cycle was decided upon for burning the entire kiln at cone 5. Even though this cycle caused overfiring, there was very little evidence of it in the ware and 80% select ware was obtained with the rest being A and B grades, with no scrap ware at all.

Ease of Grinding

Another advantage of the lightweight glazed unit was the ease with which it was ground. Only half of the normal power consumption was required to grind the tile, even though 2 to 4 times more tile was ground off because of the oversize characteristics of the experimental units which were extruded through a standard die. This was supplemented by reports from the field that the glazed lightweight unit cut considerably easier than the standard unit.

Stark also made some dry pressed firebrick using the SCR aggregate. To date, these units have outlasted standard firebrick in the bag walls of periodic kilns. Blosser felt that the full advantage of the aggregate in reducing weight could best be obtained by dry-pressing rather than extruding.

Mal Allen, manager of SCPRF's Field Engineering and Development Division, then discussed the "SCR Masonry Process*." He reported the "process" has now reached maturity with 705 cities in 37 states using the system for laying brick. He brought out the fact that the system is an excellent sales tool for masonry work and stressed the need for more and better promotion of the process by dealers and manufacturers of clay products. Even though the "SCR masonry process" is gaining acceptance, more brick can be sold if the system is promoted and used in more cities. Allen and his staff also de-

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*Reg. T. M., Pat. Pend., SCPRF

scribed and demonstrated the new "SCR corner pole**" recently developed and currently being field tested.

Jack Clark, director of promotion, SCPI, Washington, D. C., showed slides demonstrating how research can be used as a sales tool. He pointed out that the research of today results in the products of tomorrow and that the clay products industry needs research to remain competitive with other building materials.

Clar Monk, manager of the Engineering and Architectural Research Division of SCPRF, gave a report on the "SCR building panel*." He reviewed the film showing the fabrication and erection of the panels on the Hirsch clothing store in Chicago, and pointed out that the clay products industry is now in a position to compete with other panel industries by offering "parts instead of pieces."

Robert Taylor, demonstrated the use of "SCR acoustile**" in a practical sound chamber. The "acoustile" absorbed 65% of the emitted sound, more than a standard glazed unit or a lightweight concrete unit with one coat of latex paint. Taylor went on to say that SCPRF was ready to license all clay products manufacturers to make "SCR acoustile." Members of both SCPI and SCPRF will be assessed a 1½% royalty fee, of which 1% will apply toward the membership dues. Members of only one of the above organizations may be licensees for a 2¼% royalty fee, while nonmembers will be assessed 3%.

Paul Johnson reported on the progress of the project on greenstain removal from brick. Some instances of vanadium staining which resisted previously recommended treatments to prevent recurrence were cited. Permanent removal was apparently achieved by neutralizing with a saturated solution of KOH. SCPRF is currently rewriting specifications and recommendations which will be made available to members in the future.

Johnson also reviewed the work done on moisture expansion of clay products and stated that there is still no test which will realistically predict the extent to which this may be encountered in service.

Taylor concluded the first session by reviewing all the products and methods that research has made available for industry use. Taylor pointed out that SCPRF is supported by only 25% of the clay products industry and asked that all members try and get new members. He also pointed out that the clay products industry should be spending 10 million dollars for research, compared to the half million it is now spending.

The SCR masonry process attracted a lot of attention as the corner pole system was explained to the people attending the mid-year meeting.

High-Bond Mortar

Clar Monk opened the second day's session by reviewing the high-bond mortar project. He pointed out that the program is now in its final stages of testing and the mortar will soon be made available for industry use. Monk pointed out that the additive which is used in the mortar is similar to others previously tried, but with one important exception. While the earlier additives are water sensitive (the tensile strength of mortar in which they are used is considerably reduced when wet) the mortar with the new additive actually gains strength when wet. To date, tests indicate that the tensile strength of the new mortar is four times that of a standard 1:1:6 mortar, or close to that of the clay products proper.

Monk gave typical compositions of the new mortar. Two typical compositions are 1 part portland cement, 3 parts sand, and 20% by weight of the high-bond additive; or 1 part portland cement, 2¼ parts sand and 15% by weight of the additive. In both cases an anti-foam agent is also necessary.

Monk compared the costs of the new mortar with the conventional mortar and, while the additive is quite expensive, the actual cost of a masonry wall is less per square foot due to thinner construction possible with the mortar bonds that approach the tensile strength of the clay unit. He pointed out a new field lies open for this mortar in RBM work replacing reinforced concrete. Costs of RBM can now be very favorable, since with the high-bond mortar RBM will be twice as strong as standard 3000-psi concrete.

Reviews Outside Research

Dr. E. L. Kreidl, of Arthur D. Little, Inc., reviewed the work being done by his company for the Foundation. Since the durability characteristics of some types of units with partially or entirely impervious surfaces are not predictable by present methods of testing, this project is concerned with the development of new test methods by which the properties affecting durability may be better understood and measured.

Clar Monk next reported on the

*Reg. U. S. Pat. Off., SCPRF
**Reg. U. S. Pat. Off., Pat. Pend., SCPRF

use of load-bearing masonry in multistory buildings. He stressed the point that much architect education for this type of construction will be necessary even though the economies of a load-bearing wall are entirely in favor of clay products. Skeleton frames, infilled with opaque walls of clay products, usually are more expensive than buildings made with load-bearing walls of clay masonry.

Plant Seminar

Bob Taylor announced plans for a plant seminar which will be held for plant personnel of member companies for two days sometime between January 15 and February 15, 1962. The purposes of the plant seminar are: 1. Bring the latest plant operating procedure to light. 2. Bring plant personnel together for an exchange of ideas and operating know-how. 3. Point out research most needed for the solution of plant problems. The first seminar will discuss four subjects: Clay preparation, clay forming, drying and firing.

Taylor then presented the research program to be carried on during 1961-62. The program will be made up of seven major areas of activity deemed most important and of interest to the membership. This program, which was unanimously approved by both the board of management and its executive committee, was developed following the evaluation and analysis of a very complete and thorough survey of the membership.

Develop New Products

I. New Product Development—Topping the list in member interest in this category is the work to be done in the development of an 8" x 8" x 16" all-clay unit designed to compete with concrete block. Additional work is also planned in development of improved methods of attaching interior finishes to the "SCR brick*" wall and the current work on the "SCR building panel" will be continued. Investigation and studies of the utilization of structural clay tile in floor systems will be stepped up during the ensuing year. A continuing activity under new product development will be the exploring of any ideas that hold promise of reducing in-the-wall costs of clay masonry through modification of standard brick and tile shapes, erection techniques, etc.

II. Body Research—The major area of interest among the members in this category is, of course, the lightweight development program which will continue to be the major activity of the Ceramic Division.

III. Mortar Research—Mortar research ranked high in membership interest, largely because of the current program on the development of a high-bond mortar. This work will continue with the aim of completing it to the point where such a mortar will be commerically available sometime during 1962.

IV. Plant Research—While many members indicated a strong interest in the general field of plant research, there appeared to be no unanimity of opinion as to those areas of plant research which were of primary importance. Consequently, the first step in this direction will be the proposed plant seminar for member plant personnel, out of which it is hoped will come information on problems common to many that industry-wide research could help solve.

V. Architectural and Structural Research—Major emphasis in this category will be devoted to the necessary and extensive structural testing program that will permit the industry to update its test data and help substantiate its requests for higher working stresses. A corollary to this program will be the work on high-bond mortars and their use in RBM. Continuing efforts will also be made in the field of educating the architectural profession in the economies of using load-bearing clay masonry walls in multistory construction in lieu of non-load-bearing curtain walls hung from a steel or concrete frame.

VI. Site Research—The members were almost unanimous in their agreement that the SCR masonry process is one of *the* most important developments of SCPRF and that efforts to expand its acceptance and use should be continued. It was felt, however, that more and more responsibility for such work should be shifted to SCPI, the regional associations and member companies in order to free the Foundation staff for work on other important projects.

VII. Fundamental Research—The fundamental research program on the durability of dense-surfaced clay products, currently being carried on at Arthur D. Little, Inc., under the sponsorship of SCPRF was considered to be of great importance by the members responding to the survey questionnaire. Consequently, this program will be continued in 1962.

A panel of brick laid with a new high bond mortar was loaded with nine bags of cement spanned over a four foot length.

*Reg. U. S. Pat. Off., Pat. Pend., SCPRF

RIO Brick Plant Uses Shuttle

El Paso Operation Produces White Brick for Three-State

When the International Brick Co. in El Paso, Texas, abandoned its operations several years ago, a cavity of one million per month was left in the El Paso brick market. A group of El Paso business men, headed by Mitchell Landers, investigated the possibility of filling this cavity and as a result formed the Rio Brick Co., of which Landers is now president.

Located on a site formerly occupied by a cotton farm, the plant occupies 14 acres on Highway 80, about nine miles north of El Paso. The new plant site is also located on the main line of the Santa Fe Railroad. It is ideally located from a sales standpoint also, in that the company is not limited to sales in the El Paso area, which is one of the Southwest's rapidly growing areas, but it can also send its products as far north as Albuquerque, N.M., and Tucson and Phoenix, Ariz. And the fact that Rio Brick Co. is the only white-brick producer in the area doesn't hurt the sales picture at all.

Definite Market Exists

A definite market for clay products exists in this area, since hot days and cool nights present a terrific expansion problem for concrete masonry. The result is that no residential building is going on using concrete masonry. The only place this product finds its place is in commerical backup work and in interior partition walls. It is not hard to sell the merits of clay products in El Paso!

The raw materials for Rio Brick Co.'s operations are obtained by using local clays and shale, both from the immediate vicinity. The company is mining its raw materials from deposits on the west side of the Franklin Mountains; land leased from the Public Service Board in Sierra County, New Mexico, and in Culberson County, Texas. The clays are shipped into the plant site by truck and dumped into various stock piles on the open ground. With only six inches of rainfall annually, little attention has to be given to providing a covered storage area for the clay.

A Michigan front end loader is used to blend and mix the various types of clays and shales. A bucket full of each type of material is dumped onto a common pile and the front end loader then mixes the batch until the operator feels that the material is properly mixed.

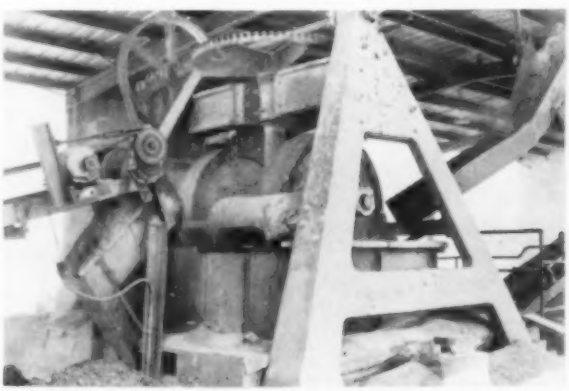
This same front end loader then dumps the mixed material into a hopper under which is located an apron feeder which was designed and built by the company's own personnel. This apron feeder feeds a uniform supply of raw material to a rubber-belt conveyor leading to an Eagle Iron Works dry pan. Another conveyor conveys the ground material to a set of two Universal screens which are equipped with 8-mesh cloth. The material which does not pass through the vibrating screens is conveyed back to the dry pan for the grinding period.

Conveyor Takes Over

The 8-mesh material is conveyed to a ground storage hopper capable of holding a half day's requirement for the forming operation. A conveyor adjacent to the storage hopper receives the material for delivery to the pug mill. This same conveyor carrying the ground material is also fed barium with a vibrating feeder located above it.

The J. C. Steele No. 40 brick machine produces about 30,000 brick per day, five days a week. The

1. A Michigan front end loader is used to mix and blend the various types of clays and shales. Here the front end loader is mixing the clays and shales by taking various bucketsful of material and turning them over.



2. An Eagle Iron Works dry pan is the primary grinding equipment used at the plant. From this machine the ground clay is conveyed to a set of two screens which return the oversize to this pan.

Kiln Profitably

Area; Fills Need Within 800-Mile Radius

column is cut with a Steele No. 18 cutter. Six hackers on the off-bearing belt set the dryer cars for package setting, so that all further handling of the green, dry and fired brick is by lift trucks, equipped with Bickerstaff forks. Four hundred-brick cubes are formed on each of the dryer cars.

Transferred to Dryer

The dryer cars are transferred to an 8-track dryer which was also built with no additional shelter overhead. Each of the tracks is 13 cars long, and with the gas fired air supply, it is possible to dry 30,000 brick per day in the entire dryer. A 48-hour cycle is normally employed for the drying operations.

From the dryer, the brick are taken by the fork lift truck to one of the kiln areas. An Advance envelope kiln is utilized for normal production needs, with one 18-ft. wide by 55-ft. long scove kiln used to supplement this production.

The Advance kiln is turned over every 24 hours. Fifty-two packs of 400 brick each are set on one hearth at a time, making a total of 20,800 brick per burn. The actual hearth is set 8-brick wide with the setting 22-brick high.

Manually Controlled Cycle

The kiln itself is about 9 feet wide and 42 feet long. The firing cycle at the Rio Brick Co. is manually controlled, so that the cycle can be altered to suit the individual characteristics of the raw material. All the fuel, as well as all primary and secondary air, is introduced at the bottom of the setting through five rows of 140 small gas burners each, making a total of 700 burners.

The exhaust from the kiln is taken through the roof of the building housing the kiln by a stack which depends on natural draft to move the gases appearing. The envelope type kiln is moved from one hearth to the other as soon as the brick have cooled off to a temperature of about 300°F. Cooling air is admitted through the bottom of the hearth, also by natural draft, the amount of which is determined by a damper opening in the crown of the kiln.

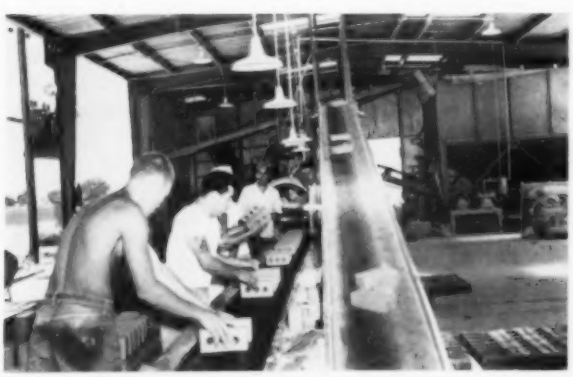
While one hearth of the envelope

(*Continued on page* 57)

4. The Advance shuttle kiln after just completing the burn. 20,800 brick are set on a hearth at one time. Fork lift trucks are used to load and unload both hearths from kiln.

5. Fork lift trucks are also used to package set the scove kiln which is used to supplement the production of the shuttle kiln. This scove kiln is turned over about twice a month, with each burn holding about 150,000 brick.

6. (above). Dow Corning silicones are applied to the brick by this spray device which was built by the Rio Brick Co.'s personnel. It is applied mostly to decrease the suction rate of the brick.



3. Brick are package set on dryer cars at the hacking belt. Notice the open type building. The raw materials surge hopper is in the right background.

7. (below). A demand for texture brick is evident in the El Paso market. To meet this demand some of the brick are rock faced with this Rockfacer machine.

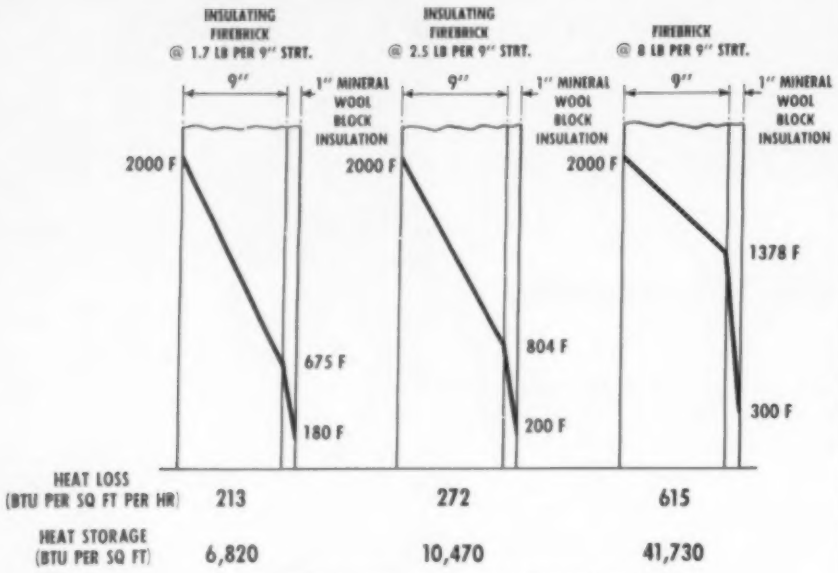


Fig. 1. Thermal properties of several wall combinations.

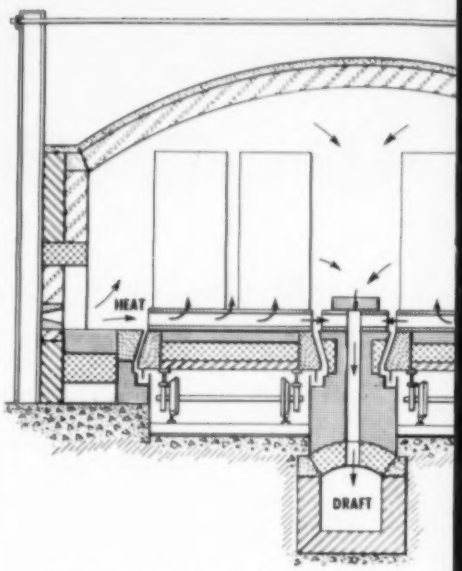


Fig. 2. Car type periodic kiln. Two rows of cars.

How Insulating Firebrick

Choice of Refractory Lining of Critical Importance with Regard to Operation

By J. D. McCULLOUGH
Chief Engineer, Refractories Division
Babcock & Wilcox Co.
New York, N. Y.

and E. B. SUDDARTH
Manager, Refractories Department
C. C. Moore & Co., Engineers
Los Angeles, Calif.

For the past decade a growing interest has been shown in kilns for batch type firing that combine some of the features of both tunnel kilns and conventional periodics. They have been rather loosely described as shuttle kilns inasmuch as in one form or another they embody an in-and-out or back-and-forth movement of components.

Broadly speaking, shuttle kilns fall in two principal categories.

First is the type in which the ware is loaded on cars which move on tracks into a fixed kiln structure, where the ware is then fired and cooled.

In the structural clay and refractories industries, the cars are normally loaded at the molding line and put through the dryer and kiln successively without further handling. The majority of such kilns have a dryer ahead of the kiln and the movement is always in one direction. There are exceptions to this arrangement, however, in which the brick are dried on dryer cars, transferred to kiln cars, and fed and discharged alternately from either end of the kiln. Such a procedure is also common in the pottery field. For the remainder of the discussion any arrangement involving firing of ware on cars will be referred to as a car type periodic kiln.

In the second category, the kiln itself is moved over the ware, which is on stationary hearths. Normally there are two fixed hearths over which the kiln is moved alternately. The ware on one hearth is fired while the finished ware on the other hearth is unloaded, and green ware stacked. This will be referred to as a movable-hood type kiln.

With either category it is necessary to subject the ware to a batch type cycle. This involves bringing the ware up to the specified temperature, holding until firing is completed, and then cooling it. In the selection of refractories for shuttle kilns, the experience gained in the construction of periodic kilns has been utilized to reduce both fuel consumption and the length of cycle.

Shuttle Kiln Operation

A periodic or shuttle kiln is merely an enclosure for retaining heat while the ware is fired to temperature and cooled. Some of the heat in the lining can be recaptured for drying and preheating, but the major portion of it is wasted. After the first several hours of cooling it is desirable to minimize the amount of heat to be dissipated in order to reduce the cooling time and thereby provide faster turnarounds.

Fig. 1 shows the basic heat storage and heat flow properties of three different types of wall or roof constructions which might be considered for a

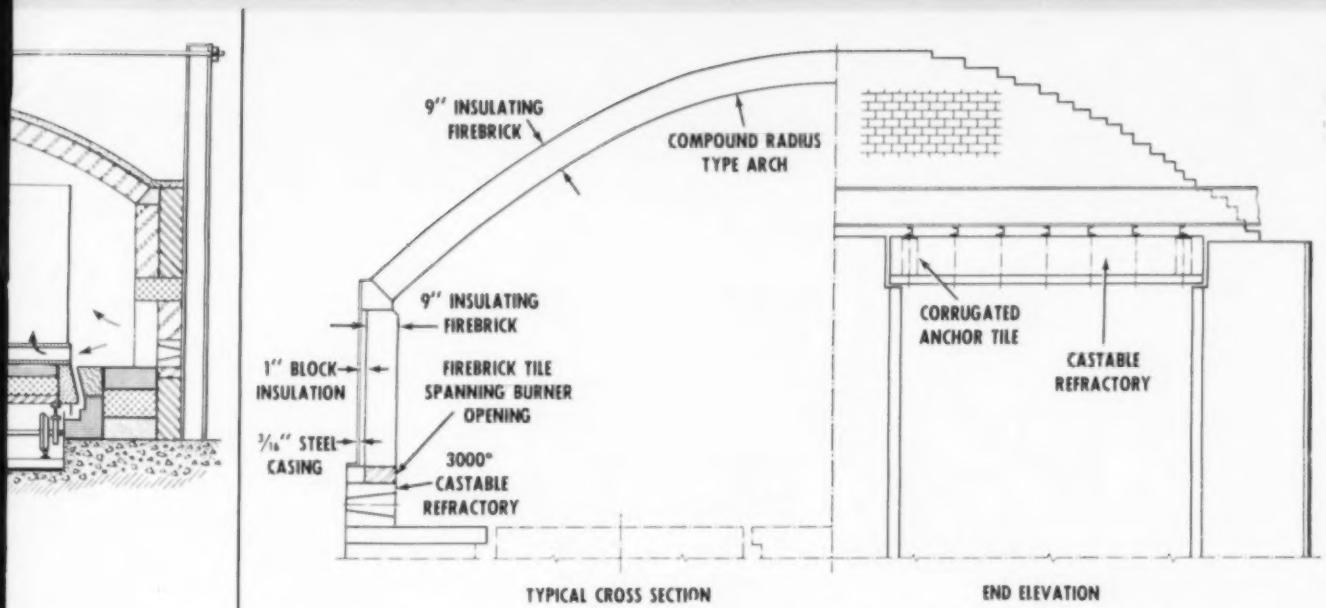


Fig. 3. Suggested refractory arrangement for car type periodic kiln. Two rows of cars

Affect Your Shuttle Kiln

kiln that is to be heated and cooled on a periodic basis. A wall construction, consisting of 9 in. of a kaolin base insulating firebrick weighing 1.7 lb. per 9 in. straight, backed up with 1 in. of a mineral wool type of block, is indicated first. The heat flow, interface temperature between materials, casing temperature, and heat storage are graphically illustrated.

Next is shown an insulating firebrick weighing 2.5 lb backed up with the same insulation. The heat flow through the wall is 28% higher and the heat storage is 52% greater. Finally is shown a combination of an 8-lb. firebrick backed up with the same insulation. The heat flow for this construction is almost three times as great as for the lightest weight insulating firebrick wall, and the heat storage is more than six times as great.

Other Pertinent Features

In addition to the figures quoted, the charts also point out several other pertinent features. First, the thermal conductivity is practically a direct function of weight. Second, the greater weight means a greater heat storage. Third, as the thermal conductivity of the exposed brick increases, the back-up insulation becomes relatively more efficient, resulting in an increase in the mean temperature of the exposed brick. Thus, with an insulated composite wall, the heat storage increases at a faster rate than a direct ratio of weights of the exposed brick. The logical conclusion is to use the lighter weight insulating firebrick to avoid penalizing kiln performance.

Use Insulating Firebrick

Because of these basic thermal considerations, the ceramic industry has widely adopted the use of insulating firebrick in periodic kilns over the past decade or so. Creson[1] and others[2, 3] have presented results of metered fuel studies, indicating impressive savings in time and fuel by the use of insulating firebrick for both roofs and walls.

Within the last several years there has been a positive trend towards reduction of wall thickness of periodic kilns to only 9 in. of insulating firebrick plus 1 in. of supplementary insulation. This is accomplished by using a steel casing instead of building brick or face brick on the outside of the kiln. Those who have erected such kilns claim that this construction reduces capital investment and makes better use of available floor space, in addition to providing maximum savings in fuel and time.

Car Type Periodics

Fig. 2 shows a cross-section of a typical car type periodic kiln with two rows of cars. This general design has been followed at several plants of brick producers in the Eastern and Southern parts of the country. Arrows indicate the flow of gases under, over, and through the ware. There are, however, variations in handling the exhaust gases, according to the preferences of individual designers.

Table I gives some pertinent information on size, capacity, and fuel economy of seven car type periodics having the general cross-section as shown in Fig. 2. These kilns are all constructed with kaolin base insulating firebrick having the lightest

From a paper presented at ACS Regional Meeting, Los Angeles, Oct. 20, 1960.

PLANT	NO. KILNS	SIZE		WARE	LOAD M BRICK	FIRING TEMP. OF	CYCLE		FUEL CU FT/M BRICK
		LENGTH	WIDTH				FIRING HRS.	COOL HRS.	
A	2	80'-0"	16'-8"	FACE BRICK	45	2020 2100	40	17	10,500
B	1	80'-0"	20'-8"	FACE BRICK	64	2150	32	40	10,000
C	1	96'-6"	19'-6"	COMMON BRICK	60	2050	32	24	6,800
D	1	50'-0"	20'-6"	FACE BRICK	25	1900	42	—	10,000
E	2	90'-0"	18'-0"	FIRECLAY BRICK	56	2550	65	10	23,000

Table I. Operating Data of Insulating Firebrick on Car Type Periodic Kiln for Firing Heavy Clay Products

weight available for the temperature grade selected.

In all cases except Plant "D," the dryers are ahead of the kiln and the brick are preheated by exhaust gases and cooling gases to temperatures of 300 F to 400 F when placed in the kiln. After firing, the cars are removed at a temperature of 800 F to 1000 F. It takes between one and two hours to pull out the cars of fired brick and to charge the unfired brick.

In Plant "D" the cars are alternately charged and discharged at opposite ends of the kiln. The brick are transferred from the dryer to the cars by fork lift truck and do not have the same amount of residual heat when placed in the kiln as do those at the other plants.

Based on the fuel and time savings previously mentioned for periodic kilns lined with insulating firebrick, it is logical to assume that the fuel consumption on the kilns listed in Table I is less than would have been the case had they been lined with heavy firebrick. It is also reasonable to assume that because of minimum heat storage the length of the firing and cooling cycle is also less, thus permitting a greater number of kiln loads to be produced annually.

Fuel Consumption

Comparison of fuel requirements must be made with qualifications. To be significant they must be made with kilns producing the same product from the same clay. In effect this means that we are restricted to comparisons among kilns in the same plant.

At Plant "A," tunnel kilns require about 78 cu. ft. of gas per thousand brick, or about 25% less than with the car type periodics. On the other hand, the latter produce 99% "A" grade brick as compared to approximately 90% from the tunnel kilns.

At Plant "B" circular coal-fired periodic kilns require approximately 25% more fuel and approximately six times as much labor.

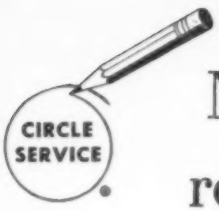
Plant "C" has a tunnel kiln firing the same ware, which requires approximately 10,500 cfm of natural gas per thousand brick, or approximately 55% more fuel. The car type periodic produces only half as many grade "B" brick.

Fuel consumption figures are not available for Plant "D," but the operators report an average of 100 re-

(*Continued on page* 53)

PLANT	SIZE		WARE	LOAD	FIRING TEMP. OF	CYCLE		FUEL CU FT/M BRICK
	LENGTH	WIDTH				FIRING HRS.	COOLING HRS.	
F	22'-0"	6'-0"	4" DRAIN TILE	5 M	2100	12	7	—
			FACE BRICK	9 M	2100	22	8	5,000
G	33'-0"	6'-6"	COMMON BRICK • GLAZED BRICK	21.6	1920	16.5	7.5	4,800
H	22'-0"	6'-0"	GLAZED WATER BRICK	6400 LB	2280	15	9	—

Table II. Operating Data on Movable Hood Type Periodic Kilns of Insulating Firebrick for Structural Clay Ware and Sanitary Tanks. Fuel, Natural Gas for All Kilns in Both Tables.



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3	18	33	48	63	78	93	108	123	138	153	168	183	198	213
4	19	34	49	64	79	94	109	124	139	154	169	184	199	214
5	20	35	50	65	80	95	110	125	140	155	170	185	200	215
6	21	36	51	66	81	96	111	126	141	156	171	186	201	216
7	22	37	52	67	82	97	112	127	142	157	172	187	202	217
8	23	38	53	68	83	98	113	128	143	158	173	188	203	218
9	24	39	54	69	84	99	114	129	144	159	174	189	204	219
10	25	40	55	70	85	100	115	130	145	160	175	190	205	220
11	26	41	56	71	86	101	116	131	146	161	176	191	206	221
12	27	42	57	72	87	102	117	132	147	162	177	192	207	222
13	28	43	58	73	88	103	118	133	148	163	178	193	208	223
14	29	44	59	74	89	104	119	134	149	164	179	194	209	224
15	30	45	60	75	90	105	120	135	150	165	180	195	210	225

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2	17	32	47	62	77	92	107	122	137	152	167	182	197	212
3	18	33	48	63	78	93	108	123	138	153	168	183	198	213
4	19	34	49	64	79	94	109	124	139	154	169	184	199	214
5	20	35	50	65	80	95	110	125	140	155	170	185	200	215
6	21	36	51	66	81	96	111	126	141	156	171	186	201	216
7	22	37	52	67	82	97	112	127	142	157	172	187	202	217
8	23	38	53	68	83	98	113	128	143	158	173	188	203	218
9	24	39	54	69	84	99	114	129	144	159	174	189	204	219
10	25	40	55	70	85	100	115	130	145	160	175	190	205	220
11	26	41	56	71	86	101	116	131	146	161	176	191	206	221
12	27	42	57	72	87	102	117	132	147	162	177	192	207	222
13	28	43	58	73	88	103	118	133	148	163	178	193	208	223
14	29	44	59	74	89	104	119	134	149	164	179	194	209	224
15	30	45	60	75	90	105	120	135	150	165	180	195	210	225

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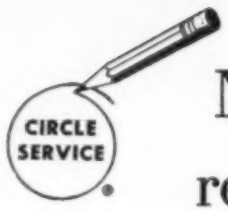

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(*Continued from page* 50)

jects for each kiln load of 25,000 brick.

At Plant "E," producing fireclay brick, the fuel consumption on 33-ft. diameter periodic kilns lined with firebrick is 30,000 cu. ft. of natural gas per thousand brick, or about 36% greater than in the car type periodics. A better grade of product is also claimed for the latter. Four circular periodics are required to equal the capacity of the single car type periodic.

Construction Features

Of the kilns listed in Table I, the arches in all cases are 9 in. thick. It was observed that the arch of the kiln at plant "A" was in excellent condition with no signs of deterioration in any manner after 400 burns.

The exposed walls of this kiln are 9 in. of insulating firebrick backed up with hollow tile. The walls in the other kilns are 9 in. of insulating firebrick backed up with 8 in. of common brick except for those at Plants "B" and "D." The burner arrangement on these kilns dictated the use of firebrick linings.

Door constructions in all cases are of 9-in. insulating firebrick mounted on a car. The edges of the door, as well as the jambs, are of heavy firebrick. This assures proper strength to resist abrasion and the shearing effect produced when the fireclay seal around the door is broken during kiln discharge.

The trend in kiln design is toward a thin-wall steel-cased kiln, as illustrated by Fig. 3. Substitution of a steel casing for common brick backup reduces floor space and results in reduced masonry costs. In addition, cracking of outside brickwork is eliminated together with resultant air leakage and the necessity of periodic pointing-up.

Movable Hood Kilns

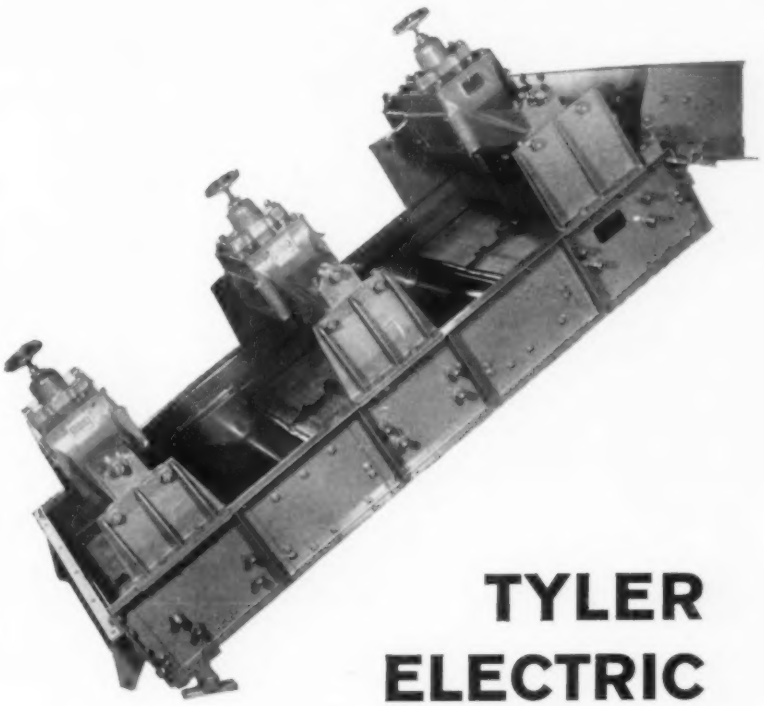
In the introduction reference was made to a kiln which moved alternately back and forth over two fixed hearths on which the ware was loaded. Such a kiln is described in the story on the Rio Brick Co. in this issue. Burners are located at the bottom of the hood along the sidewalls and fire vertically. Vertical burners are also distributed through the hearths, baffled in such a manner as to avoid localized overheating.

For a movable hood of this type, it is desirable to keep weight to a minimum. Walls, arches and doors are 9 in. of the lightest weight insulating firebrick of suitable temperature grade plus 1 in. to 2 in. of back-up insulation.

Kilns of this design are used not only by heavy clay producers but also by manufacturers of pottery, sanitaryware and other ceramic products.

Operating data on several kilns of this type are shown in Table II.

From the data listed in this table, it will be noted that the kilns are smaller and of much lower capacity than those listed in Table I. Generally the total cycle time is less for the movable hood kilns than for the larger car type periodics. This may be due to a difference in the type of clays, design or both. The relatively small amount of very lightweight insulating firebrick in the hood as compared with the mass of green ware assures a minimum amount of heat absorption by the lining, thus contributing both to lower fuel con-



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sumption and shorter firing and cooling periods. Kilns of this design are reported to be operating satisfactorily with minimum maintenance for the past six years.

Conclusion

Shuttle kilns of various types have established a definite place for themselves in all branches of the ceramic industry. Since they operate on a periodic basis the selection of the refractory lining is of critical importance with regard to operation. Designers and operators have learned on the basis of experience with conventional periodic kilns that maximum efficiency is obtained by selecting lightweight insulating firebrick rather than intermediate or heavier weight grades.

Acknowledgment—The authors take this opportunity to thank the many individuals whose wholehearted cooperation made this paper possible.

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1. "Insulating Firebrick for Structural Clay Products Plants," by W. F. Creson. Canadian Ceramic Society, Hamilton, Ont., Canada, Feb., 1955.

2. "Insulating Firebrick in the Structural Clay Products Industry—Periodic Kilns," by R. C. Shehane and P. R. McClafferty. American Ceramic Society, Philadelphia, Pa., April 27, 1960.

3. "Insulating Firebrick in Shuttle and Tunnel Kilns," by J. B. Brovarone, Jr., and A. O. Downs, Jr. American Ceramic Society, Philadelphia, Pa., April 26, 1960.

Ampac Signs Agreement With Gladding, McBean

An agreement for the manufacture of high temperature refractory materials has been signed between Ampac Metal Die Co. Inc., San Diego, Calif., manufacturer of refractory products, and the Gladding, McBean & Co., Los Angeles manufacturer of diversified ceramic products, it was announced recently by William F. Godejohn, vice president and general manager of the refractories division of Gladding, McBean, and Charles H. Miller, president of Ampac.

The agreement provides that Gladding, McBean will manufacture, package and distribute products developed and owned by Ampac within the American market on an exclusive basis.

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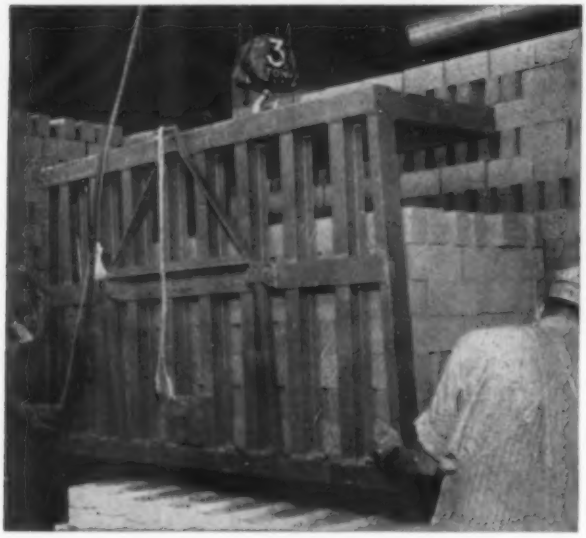

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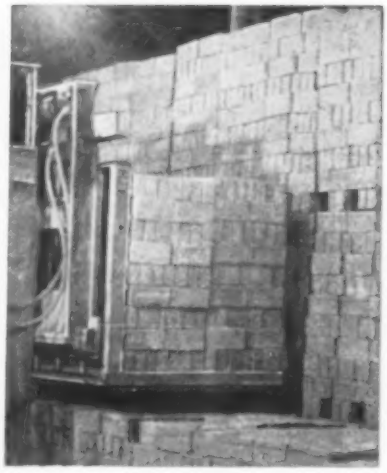
Also Priester truck cranes for unloading from delivery trucks. Write for bulletin.

Brick in units of any size are handled by Priester Brick Forks. Automatic operation simplifies and speeds brick handling, setting and drawing kilns, loading and unloading trucks and box cars.



Forks with flap grippers for cored and solid brick. Give service . . . take the hard work out of brick handling. Write today for more information.

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IDEAL FOR MECHANICAL FEEDING—Uniformity and easy flow of New CERAMIX BT Barium Carbonate permits you to get a constant rate of barium addition without frequent adjustments in feeder settings.

PROVED IN THE FIELD—New CERAMIX BT Barium Carbonate has been in commercial production use in brick and clay product plants for several months now. All users are enthusiastic about its performance with all types of clays and shales, running in a wide variety of feeding equipment. Regular truckload and carload shipments of this improved Barium Carbonate are now being made. Best of all, high-purity, free-flowing New CERAMIX BT comes to you at *no premium in price.*

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Rio Brick . . .

(*Continued from page* 47)

kiln is burning, the fork truck is setting the other hearth, and as soon as the firing cycle has been completed and the brick cooled to 800°F., the doors on each end of the kiln are raised and the envelope moved from the first hearth to the second. Thus the enclosure is still warm while being moved and no fuel is required to preheat the kiln.

After the burn has been completed, the brick are removed from the hearth by the same fork lift truck which originally set the ware in the kiln. The entire unloading procedure takes a little less than two hours, as does the loading procedure. The brick are moved to the finished stock area, where they will later be sent to the production line where silicones are applied to the brick. Dow Corning Sileaneal is applied to the brick by means of a spray type device which was also designed and built by the company's own personnel.

Rock Faced Brick

Brick are also rock faced at the Rio Brick Co.'s operation because of the great demand for this type of product. In both the rock facing operation and the silicone operation the brick are palletized for further handling. Fork lift trucks are used to load the delivery vehicles. At the present time, almost 100% of deliveries are made by motor truck, although shipments can be made by rail.

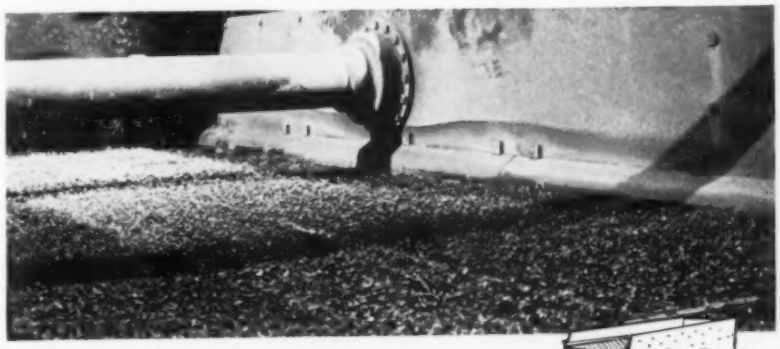
In addition to Landers, who is president of the Rio Brick Co., Glenn Powers is plant manager of the firm. The former mayor of El Paso, Dan Ponder, is board chairman, while C. H. Leavell is a board member. Dan White is serving the company as vice-president and treasurer; Tad Smith as secretary, and Joe Davis as general sales manager.

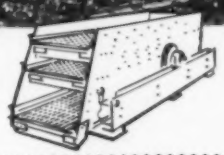
USCP Elects McGarry

William R. McGarry has been elected president of United States Concrete Pipe Co., manufacturers of vitrified clay pipe and other products. McGarry succeeds Robert M. Moore, who died recently. The new president started his career with the company in 1935 and moved from production to sales in 1949.

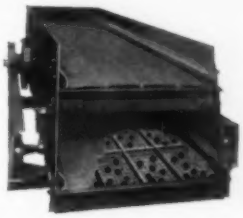
5 Big Reasons

why the name SECO means BETTER screening





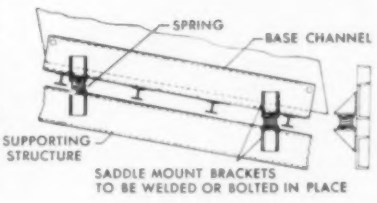
1 *SECO* offers a wide variety of screens to fill every need, in fact about 450 single, double, triple and half deck models.



2 *SECO* offers the extras you need for screening, damp, sticky materials: WIRE cloth heating attachment and a ball tray (shown at right), for use alone or with heater.

3 *SECO* has been manufacturing vibrating screens *exclusively* for more than a quarter of a century. That's your assurance of vibrating screen know-how second to none.

4 *SECO* has pioneered many of the important changes in screens including the introduction of the *SECO* Equalizer Assembly and the spring and saddle mount (right) which isolates the screen from interference of plant frequencies and prevents the screen from transmitting vibration to supporting structures.



5 *SECO* puts the accent on service. On those infrequent occasions when a *SECO* screen needs a replacement part, *SECO* ships standard parts via air the *same day* they're ordered!

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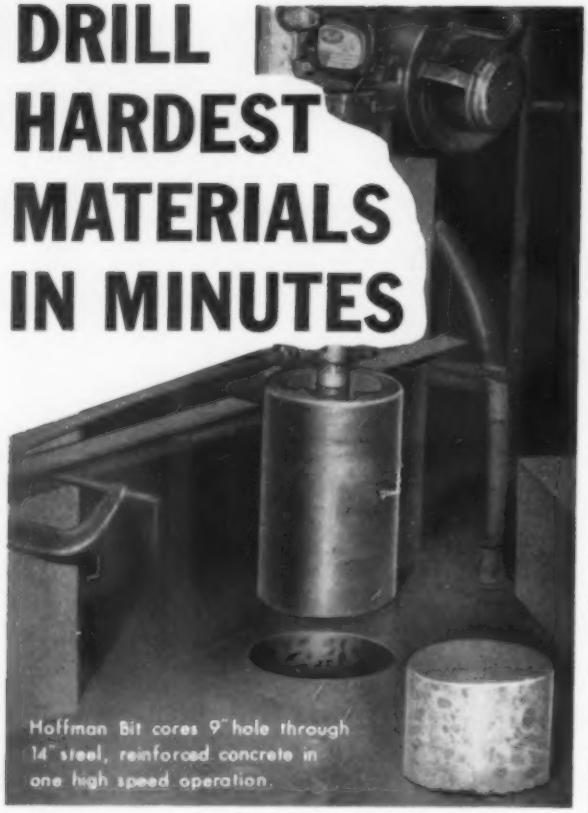

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Time was when weather was a factor in clay deliveries. It can never be a factor at Spinks.

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Refractories Are Highlight Of West Coast Meeting

Don McTaggart and Charles E. Dyer of Corning Glass Works prepared an illustrated paper which explains the destructive processes in the environment of the super structures and regenerators of production glass furnaces. These destructive processes are found to involve reactions between the refractories and solids, liquids and vapors in the environment, as well as cyclic volume changes of condensate liquids. McTaggart and Dyer describe "Test Devices to Study the Effect of Glass Furnace Environment on Refractory Materials."

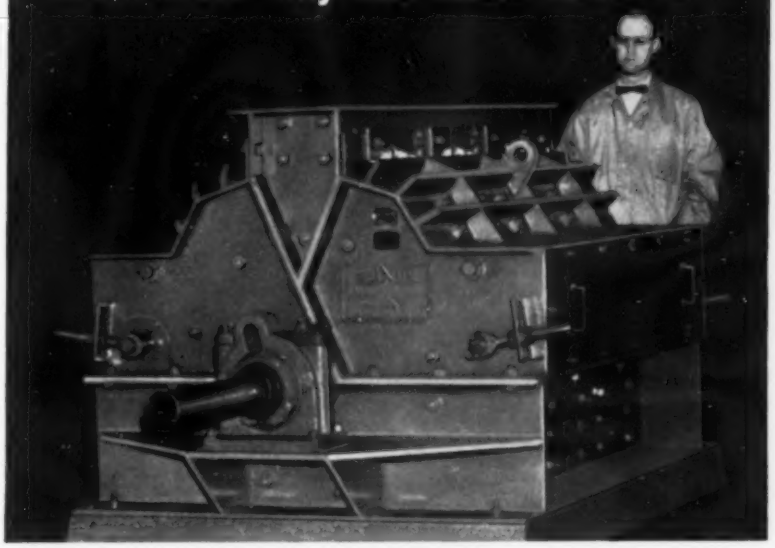
Walsh Refractories Corp. will discuss their new refractories for the

glass industry and glass stones will be the subject of the paper by David Johnson of Corhart Refractories.

E. A. Thomas, chief ceramic engineer with Charles Taylor Sons' Research and Development Department in Cincinnati, will present a report on recent developments in the application of zircon refractories to glass furnace construction, while James L. Lange, also of Charles Taylor Sons, has offered insights into the application of bonded mullite for the steel industry, particularly in blast furnace stoves where higher than normal hot blast temperatures are being used.

The name of W. S. Debenham, the chief research engineer with refractories at United States Steel Corp. in Pittsburgh, is familiar to most of us on the West Coast, and judging from past performances, his place on the program will promise an up-to-date discussion of refractories and steel. In addition, we are fortunate to have Hobart N. Kraner of Bethlehem Steel who also has earned a big welcome

Economical Clay and Shale Reduction!



WILLIAMS REVERSIBLE IMPACTOR produces MORE TONNAGE of BETTER QUALITY at LOWER COST

Crushing clay and shale to desired uniform fineness for burning, or reducing culls and rejects, is done in greater volume at less cost in a Williams Reversible Impactor than with any other type of reduction equipment.

CLOSEUP shows interior of small Impactor. Note rugged hammers, impact blocks and liners made of long wearing manganese steel. Full accessibility allows rotor removal without disturbing feed or other overhead mechanisms.

With a closed circuit system, precision size control down to 10 mesh or finer, is easily maintained. Reduction of lime pebbles and other tailings to specified size safeguards against popping, wire breakage and similar troubles.

Reversible rotation and interchangeable impact blocks distribute wear, prolong parts life several times. Absence of grates eliminates all wear normally caused by grinding and rubbing. Complete internal accessibility simplifies service, reduces downtime and labor to a minimum.

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OLDEST AND LARGEST MANUFACTURERS OF HAMMER MILLS IN THE WORLD

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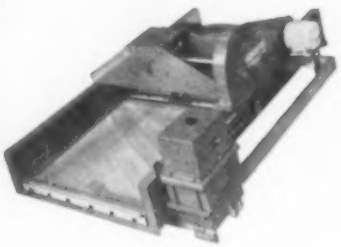

Check the performances of the Leahy screen with that of any other on the market. None offers all of these advantages:

1. Differential Vibration . . . 1600 differential vibrations per minute literally kick wedging particles out of the mesh.
2. Only the jacket vibrates, saving substantial power. The heavy steel frame is for containment and stability only.
3. FlexElex® jacket heating keeps the mesh dry and wide open for full capacity production.
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INTEGRATED HEAT SCREENING

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here with his timely comments on the latest information from Bethlehem Steel Co.'s experience.

The meeting will be held at the Jack Tar Hotel, San Francisco, October 25 to 28. Plan now to attend. *D. W. Kucera, 625 Market St., San Francisco, Calif.*

Name Teale Distributor

American Truck Body Co., Martinsville, Va., has become exclusive distributor for the Teale truck crane for the states of West Virginia, Virginia, North Carolina, South Carolina, Georgia, Alabama, Mississippi, Louisiana, Eastern Tennessee, Eastern Kentucky and the greater Pensacola, Fla., area. American Truck Body will have direct company sales engineers as well as dealers throughout the territory to sell and service the units.

Use More Old Brick

A report carried in a recent issue of the *Richmond Dispatch* is that the market for old used brick is growing in the Richmond, Va., area.

Features claimed for the old brick are its antique value, they are 20% larger than new brick and therefore 20% less brick are needed for a job.

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2) Technical representatives backed by modern research facilities coupled with 66 years of experience present a backlog of unparalled information that is available to the brick producing industry.
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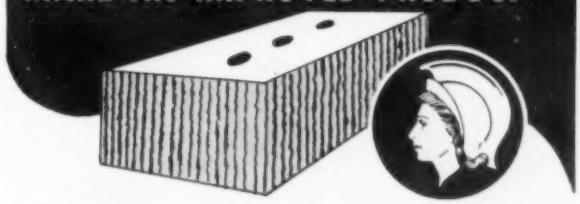

MINERVA FLUORITE vitrifies light face brick at low temperatures. Seals in vanadium and iron salts. Eliminates danger of darkening colors through high firing. Improves finished product.

- STOPS GREEN SCUM PERMANENTLY
- ALLOWS DELICATE COLOR CONTROL
- LOWERS FUEL REQUIREMENTS 20% TO 30%
- IMPROVES STRUCTURAL STRENGTH OF BRICK
- INSURES STRONG, WATERPROOF MORTAR BOND
- COSTS ABOUT 50¢ PER TON OF CLAY
- TECHNICAL ASSISTANCE AVAILABLE

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Circle Service No. 37

Ceramic Block . . .

(*Continued from page* 40)

clay are completely incompatible with forming requirements if conventional or slightly modified concrete block machinery is used.

Clay bodies lend themselves to forming by extrusion; however, reports indicate that a ceramic block with the previously discussed properties cannot be extruded successfully on a practical basis at this time. They can be formed by static pressure and simultaneous vibration; this type of action is fundamental to concrete block machinery. Appreciable percentages of clay literally "gum up the works" of a concrete block machine. Therefore, the use of clay in the composition should be limited to the extent that no plasticity is evident in the composition. Certainly, these large building units should not be called bonded blocks. They should be called *ceramic blocks.*

ACKNOWLEDGEMENT

This work was supported in part by the Statesville Brick Company, Statesville, N. C. The author is grateful to Mr. E. R. Rankin, president, and Mr. J. E. Rankin, vice president of this firm, for their help, guidance and for the permisison to publish this work.

Dickey Appoints Kovarik

Vincent J. Kovarik has been appointed field engineer for the St. Louis plant of the W. S. Dickey Clay Manufacturing Co.

In his new post he will be assigned to the St. Louis office, covering Eastern Missouri and Illinois. He will work primarily with engineers, municipal officials and contractors, it was announced.

Kovark joins Dickey from the Massman Construction Co., where he had been employed as a construction engineer.

Plan Windowless Schools

The Montgomery Country, Md., Board of Education has approved plans for construction of this area's first windowless schools. Weeks of discussion centered around the concern of some county parents that schools should have plenty of windows.

The purposes of the new design, officials said, is to construct school buildings more cheaply and at the same time to make them compact and flexible.

New H-W Unit

The Harbison-Walker Refractories Co., is building a rotary kiln plant in Eufaula, Ala., for the calcining of bauxite and kaolin clays to be used at the company's Bessemer, Ala., plant.

Rutland Opens Plant

The Rutland Fire Clay Co., of Vermont has set up a plant in Gastonia, N. C. The one at Gastonia is the firm's second branch, the first being built in Jacksonville, Ill., in 1952.

Name Texas Distributor

Texas Industries, Inc., Dallas, Tex., has been designated exclusive distributor in the entire state of Texas for the Arketex Ceramic Corp., Brazil, Ind.

Arketex is a large producer of ceramic glazed structural tile and has pioneered many phases in the field.

new markets! new profits!
with "hand dressed"
BRICK
by **PITCHMASTER**

Here is a machine that incorporates the skills of the craftsman with more production muscle than twenty men.

Reach NEW markets, NEW profits by offering a NEW brick with greater depth of beauty.

- Culled brick can be converted to premium priced material.
- Fifty lineal feet of "Hand-Dressed" brick per minute.
- Instant adjustment to material height and depth of pitch. No limitation on material length.
- All material is conveyed through machine in a continuous flow by belts and rollers. Machine maintenance is reduced to the absolute minimum.

No other comparable machine in the field today will match the productivity and dollar profit that PITCHMASTER affords to make it a common sense investment.

NEW AND REVOLUTIONARY IN DESIGN! TESTED AND PROVEN

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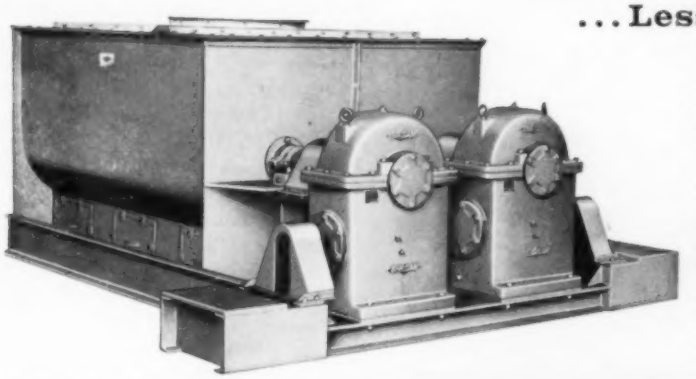
EHRSAM DOUBLE-BARREL MIXER

Increases Productivity ...Lessens Costly Downtime



The Ehrsam double-barrel paddle mixer writes its own ticket for economy and increased productivity as a fast, heavy-duty machine for the intensive blending of dry, powdered or granular materials.

Precision engineering and construction cut costly, annoying downtime. Steel plate mixing barrels, adjustable stuffing box seals, heavy-duty roller bearing pillow blocks are only a few of the stress points designed to withstand abusive, day-after-day operation.

Combined with a surge hopper, charging hopper with scales, Ehrsam will program an automatic charging, mixing, and discharge operation to your specifications.

20 TO 120 CUBIC-FOOT MODELS AVAILABLE

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Enterprise, Kansas

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EHRSAM **Enterprise, Kansas**

Please send new Ehrsam Mixer Catalog 8A. I am also interested in surge hoppers____; screw conveyors____; Dracon____; belt conveyors____; and bucket elevators____.

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FIRM_____

ADDRESS_____

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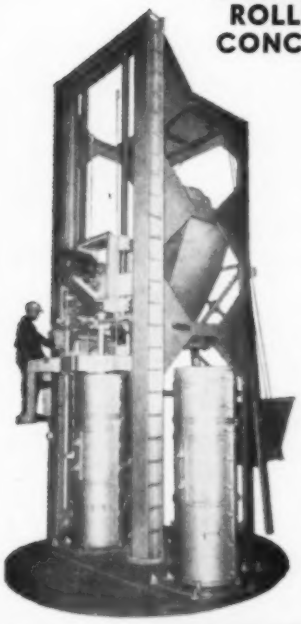
E-M/2-661

Circle Service No. 38

HYDROTILE

ROLLER PACKERHEAD CONCRETE PIPE & TILE MACHINE



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Makes precision gasket pipe as well as plain mortar joint or regular culvert pipe.

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●

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WRITE FOR LITERATURE

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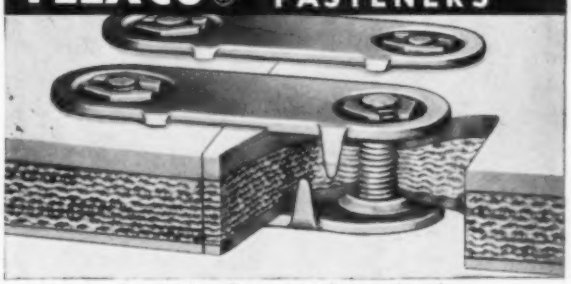
AMERICAN CONCRETE PIPE ASSOCIATION

Circle Service No. 39

FLEXCO® CONVEYOR BELT FASTENERS



Compression plates, properly spaced teeth, precision-made bolts and nuts assure . . .

tremendous holding power at the vital point!

Positive gripping action on both sides of belt...trough naturally . . . distribute pull or tension evenly across joint . . . reduce maintenance headaches.

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Order from your distributor, or write to us for Bulletin F-112.

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"25-PAK" contains enough fasteners to join common belt widths.

"FOR THE SPLICE OF A LIFETIME"

Flexible **STEEL LACING COMPANY**

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transmit power through the air!

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★ Dual voltage, 220/440 volt
★ Use either plain or stainless cloth
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CANTON 7, OHIO, U. S. A. — CABLE HANCO

EUROPEAN SALES AND MFG.
HANCO INTERNATIONAL
6 WIBAUTSTRAAT • AMSTERDAM, HOLLAND

Circle Service No. 42

Goodwins Sell Stock

Bell Intercontinental Corp., well known in missile construction and other fields, is buying a substantial interest in the Central National Bank & Trust Co., Des Moines, Iowa.

The stock purchased by Bell includes part of the interest in the bank of Central National chairman Robert K. Goodwin and of William J. Goodwin and William J. Goodwin, Jr., plus shares owned by other stockholders. Members of the Goodwin family are engaged in large scale brickmaking operations in Iowa.

This sale involves about $9,000,000. Goodwin said Bell would be represented on the bank's board in the future but there will be no other changes in management. Central National had resources of $124,200,000 as of June 30.

Brick Budget House

Plans for a ready-to-occupy brick house in the budget price range have been developed in North Carolina's brick industry.

Illustrated descriptive literature is available from Brick and Tile Service, Inc., Greensboro, N.C.

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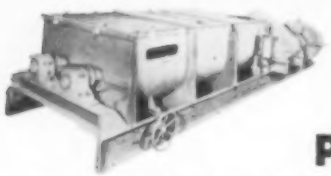

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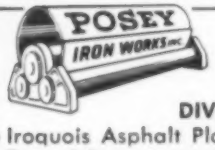

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ADVERTISERS INDEX

A

Acme Steel Co. 17
*American Clay Machinery (Div. HUber Warco Co.) 70
American Minerals, Inc. 54

B

*Babcock & Wilcox Co. 13
Besser Company 19
Bickerstaff, Inc. 9
*Bonnot (The) Co. 55
Bradney Machine Co. 56
Brick & Clay Record 64, 67

C

Cahners Publishing Co. 23
Ceramic Data Book 34
*Chambers Bros. Co. 4
*Chase Foundry & Machine Co. 61
*Chisholm, Boyd & White Co. 33
Classified Ads 66-67
Columbia-Southern Corp. (Div. Pittsburgh Plate Glass Co.) 56

D

*Deister Concentrator Co., Inc. 60
Des Moines Glove & Mfg. Co. 65
Dodge Mfg. Co. 6
*Drakenfeld (B. F.) & Co., Inc. 2

E

E. & R. Mfg. Co. 62
Ehrsam (J. B.) & Sons Mfg. Co. 63

F

*Fate-Root-Heath Co. 69
Flexible Steel Lacing Co. 63

G

*Gravely Tractors Div. (Studebaker-Packard Corp.) 14

H

*Hannon (F. R.) & Sons 64
Hoffman Bros. Drilling Co. 58
Hydrotile Machinery Co. 63

I

*International Clay Machinery Co. 54

K

*Kimberly-Clark Corp. 7

L

Laeis-Werke, AG 10
*Lanly Company 12

M

Master Machines, Inc. 11
*Miller Equipment Co. 15
*Minneapolis-Honeywell Reg. Co. 22
Minerva Company 61

N

National Paint & Manganese Co. 61
North State Pyrophyllite Co. 16

O

Ohio Fire Brick Co. 28

P

Paris Mfg. Co. 60
Pearne & Lacy Machine Co. 8
*Pennsylvania Crusher Div. 21
*Posey Iron Works 64

R

Reichhold Chemicals, Inc. 65

S

Screen Equipment Co. 57
Spinks, H. C. 58
*Steele (J. C.) & Sons 68

T

*Titanium Alloy Mfg. Div. (National Lead Co.) 3
*Tyler (W. S.) Co. 53

U

*Universal Atlas Cement 30

W

*Wellsville Fire Brick Co. 24
*Williams Patent Crusher & Pulverizer Co. 59

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Large refractory company in Middle West has immediate need for recent graduates and experienced research and development engineers. Modern research facilities in excellent small city. Full benefit program. Salary open. Submit complete application data to Box 8-BCD care of Brick & Clay Record.

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Immediate opening in modern research center for specialist in petrography and x-ray diffraction methods. A leading refractory manufacturer, located in the mid-west. Many employee benefits. Salary open. Send resume to Box 8-BBC care of Brick & Clay Record.

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ENGINEER-SALES. Equipment manufacturer seeks responsible experienced Engineer to handle sales. Knowledge of Ceramic and heavy clay products industry required. Engineering degree highly desirable. Considerable traveling involved. Right salary for right man. Write Box 8-BGF care of Brick & Clay Record.

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WANTED MECHANIC—For Common Brick Plant. Must have experience with Chambers Brothers Machinery. Ability to handle all phases of maintenance, lubrication, etc. STEADY—GOOD SALARY. Send resume of experience to Box 429, Cliffwood, New Jersey.

SUPERINTENDENT—Wanted for hollow ware and farm drain tile with some experience in these lines. Write Box 8-BHT care of Brick & Clay Record.

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POSITION WANTED—Job as manager or superintendent with good reliable firm—Years of experience in all phases of operations in both tunnel and periodic kilns. Hard worker who understands costs and strives for recovery of good products. Write Box 7-BDK Brick and Clay Record.

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1—Bonnot 5' x 10' contin. ball mill, 75 HP.
1—Symons 2' shorthead cone crusher.
1—Symons 4' shorthead cone crusher.
1—Denver 4' x 10' contin. rod mill, 60 HP.
1—8' x 60' rotary kiln, ½" welded.

IN STOCK

1—Vulcan 10' x 11' x 175' rotary kiln, 13/16" shell.
2—National 10' x 78' rotary dryers, ¾" shell.
2—Hardinge 8'-8" x 70' rot. dryers, ⅝" welded.
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ONE, Real Hand cutter.
ONE, Steel No. 18 Automatic Cutter.
ONE, International De-airing Combined Falcon, with extra liners knives, pinion shaft resurfaced augers—good condition.
ONE, American Automatic No. 858 Automatic Electric Cutter good condition.
TWO Fernholtz 48" cage type ulverizers, one SK.F. bearing the other water cooled babitted bearing, all good condition.
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1—Set Steele automatic off-bearing, finishing and palletizing for 4" to 10" pipe in various lengths.
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IOWA PIPE AND TILE CO.
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FOR SALE—Cone 34 Calcined Flint in lump or ground form and cone 36 High Alumina Nodular Clay. Union Minerals, Inc., 2306 First Natl. Bank Bldg., Pittsburgh 22, Pa.

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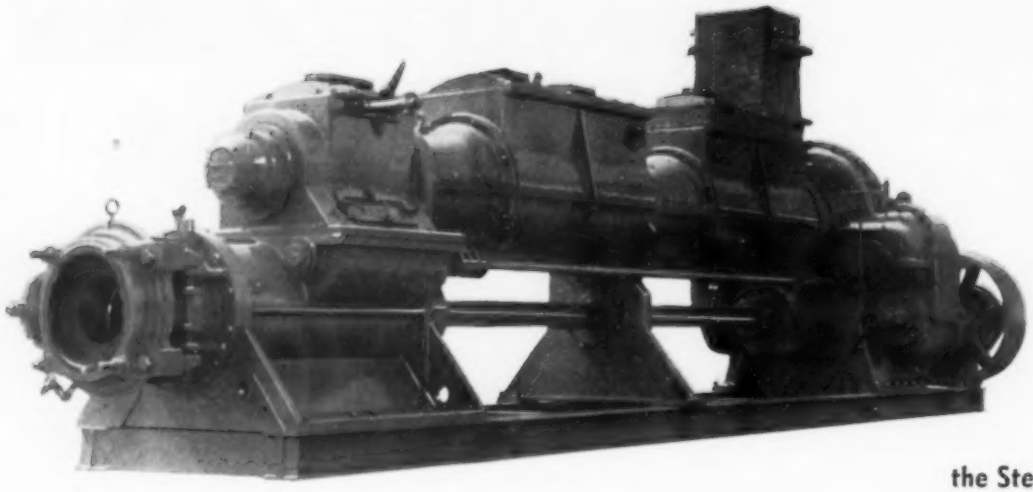

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No. 60 FDV
Double Vacuum Pug Sealing
and Vacuum Extruding Machine

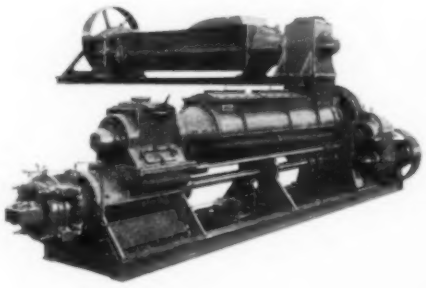
for Compact and Economical Vacuum Pugging

The 60FDV shown above pugs twice, seals and shreds twice, and de-airs twice. The effectiveness of this intensive preparation has been proved beyond doubt in the many installations of the 60FV machine with 50F Pug Sealer shown on the small illustration below.

Limited space has prevented the easy installation of the 60FV-50F combination of machines in several plants which *need* the ultimate in clay preparation. The new 60FDV was designed to overcome this difficulty.

The 60FDV has two completely independent drives. The upper shaft (both pug mills and both sealing augers and shredders) is powered with 150 HP through double reduction gearing. The lower (extrusion auger) shaft, also equipped with double reduction gears, can handle 200 HP of continuous loading. The 60FDV is thus a *separate drive* machine requiring only *one* foundation level.

The two pug mills are each 5'2" long. Where even moderately favorable conditions of clay consistency and moisture content exist, the new 60FDV can provide all of the tremendous advantages of the 60FV-50F plus savings in height, savings in floor space, and the elimination of one complete drive.



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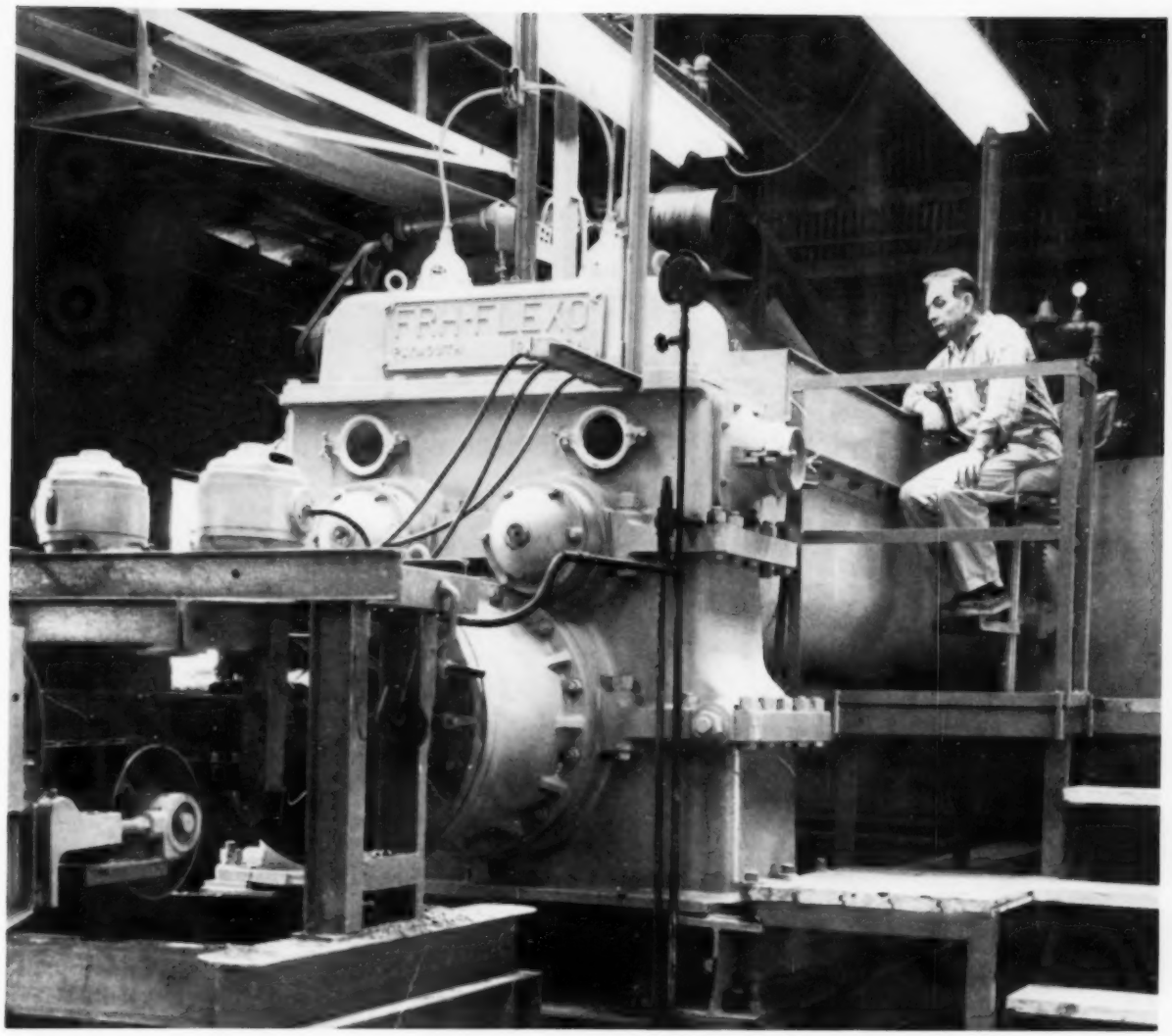
SUSTAINING ASSOCIATE SCPI

J. C. Steele & SONS, Inc., Statesville, N. C.

Pacific Agents: Walter C. Stoll, 5028 Alhambra Ave., Los Angeles 32, Calif.

THE BEST IN CLAY MACHINERY SINCE 1889

Circle Service No. 46



"Our Ninth F-R-H Machine in 16 Years"

"F-R-H Machines were instrumental in helping us to produce 85-million top-quality, both standard and oversize, face brick last year. With the installation of this new model WX-12, our production operation was greatly simplified, resulting in a more improved product. This model, with its high-capacity capabilities, will allow us to increase our production by 25%," according to James A. Hedgpeth, Vice President in Charge of Production, Marion Brick Corporation, Marion, Ohio.

A satisfied F-R-H user for over 20 years, Marion Brick is typical of hundreds of manufacturers who recognize the high capacity, top-quality production power of F-R-H Ceramic Machines. This latest model WX can utilize up to 300 horsepower and extrudes stiff, uniform columns of clay up to 22,000 brick per hour.

Find out how F-R-H fast operation, low power consumption, efficient de-airing and long, dependable service can improve your operation. For obligation-free analysis of your needs, send brief outline of your operation to THE FATE-ROOT-HEATH COMPANY, Dept. B-1, Plymouth, Ohio.

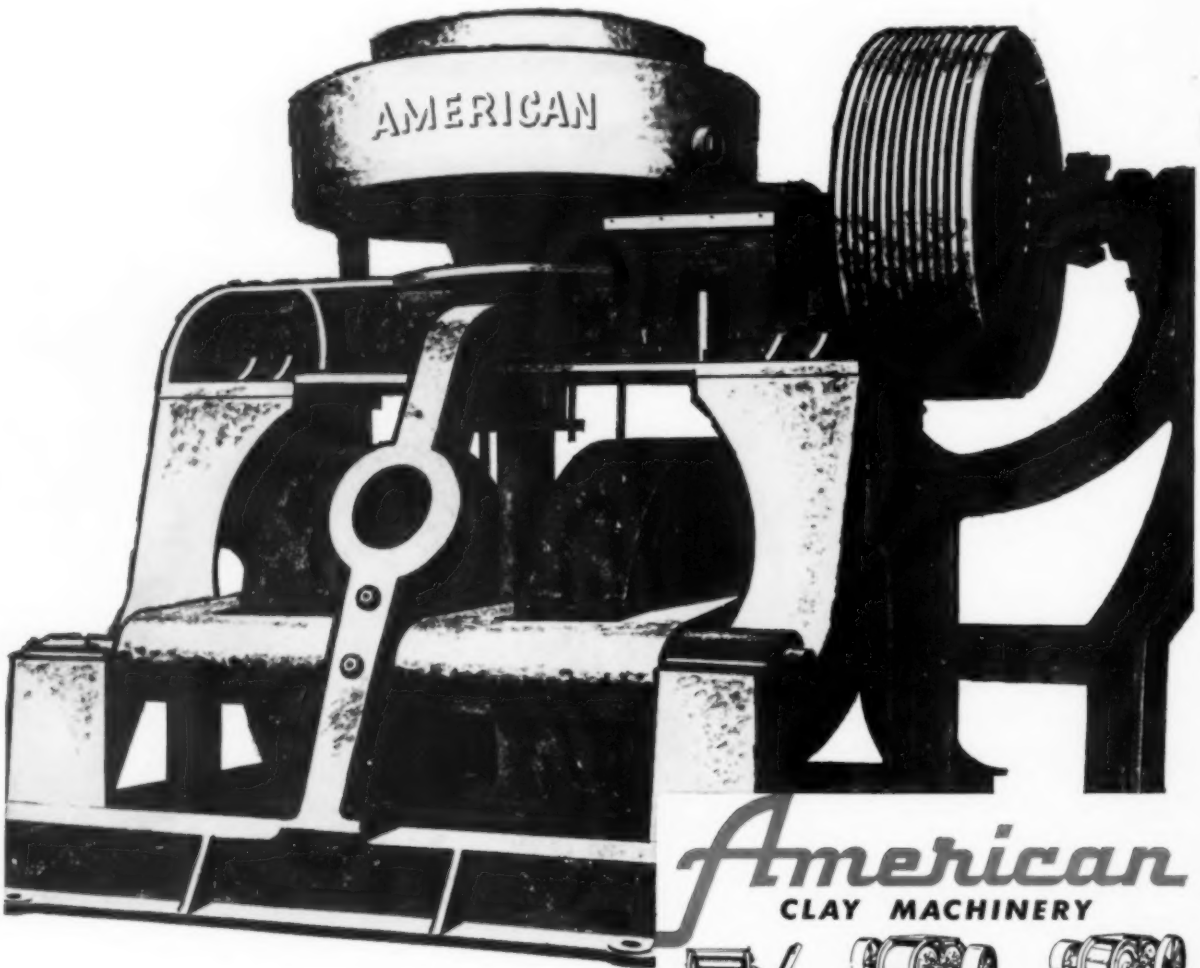
F-R-H

CERAMIC MACHINERY

FOR 100% OPERATING EFFICIENCY—ORDER GENUINE F-R-H REPLACEMENT PARTS DIRECTLY FROM THE FACTORY.

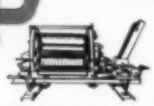
Circle Service No. 47

NEED BIGGER VOLUME AND LOWER MAINTENANCE COSTS? The American 384 grinder provides both. It grinds up to 75 tons per hour depending on the type of material and moisture content. And there are no screen plates to clog and slow down production. Power consumption is low—you get the production of four 9-foot dry pans on less power. Heavy-duty construction means long life and low maintenance costs—lower than other types or combinations of grinding equipment. Check all the American 384 features soon—a quality machine designed to increase profits.

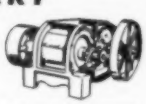


Do Your Job The AMERICAN Way

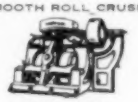
American
CLAY MACHINERY


ELECTRIC CUTTERS

SMOOTH ROLL CRUSHERS


DISINTEGRATORS

PUG MILLS


GRINDERS

COMBINATION DE-AIRING MACHINES

DIVISION OF
HUBER-WARCO COMPANY · Marion, Ohio, U.S.A.

Circle Service No. 48